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KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

CURRICULUM GRADE 10 -12 DIRECTORATE

NCS (CAPS) SUPPORT

JUST IN TIME LEARNER and TEACHER REVISION DOCUMENT

GEOGRAPHY

GRADE 12

2026

HIGHFLYER DOCUMENT

NB Teacher Document After Page 67

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PREAMBLE

This support document serves to assist Geography Grade 12 learners in dealing with curriculum content gaps and learning losses. Activities serve as a guide on how various topics are assessed at different cognitive levels and prepare learners for informal and formal tasks in Geography.

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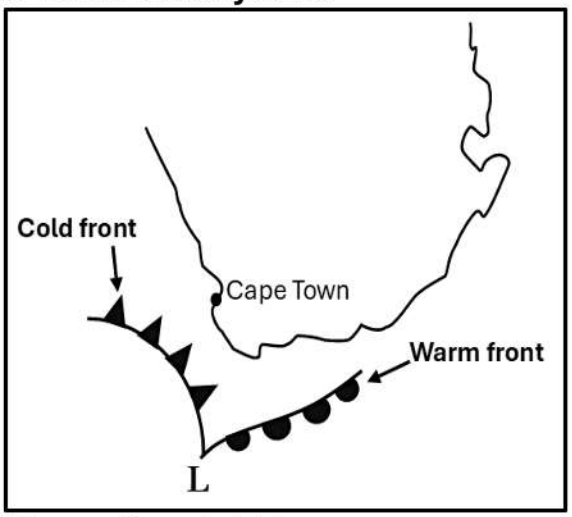
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CLIMATE AND WEATHER

MIDLATITUDE CYCLONES

KEY CONCEPTS	DEFINITION
Midlatitude cyclone	An intense low-pressure system which consists of a cold front and warm front occurring between 30°-60° N/S.
Polar front	Zone that develops at 60° N/S which separates cold polar easterlies and warm tropical westerlies.
Cold front	A leading edge of cold air separating cold air from warm air.
Warm front	A leading edge of warm air separating warm air from cold air.
Cyclogenesis	The various stages of development of a cyclone.
Backing	Change of wind direction from north-west to southwest (anticlockwise) on a midlatitude cyclone in the southern hemisphere.
Veering	Change of wind direction in a clockwise circulation on a midlatitude cyclone in the northern hemisphere.
Family of cyclone	A group of midlatitude cyclones passing over an area.

A midlatitude cyclone



[Source: Own sketch]

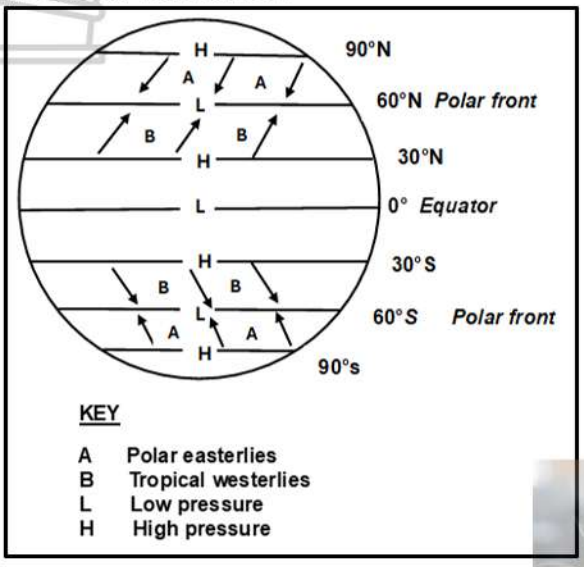
GENERAL CHARACTERISTICS

- **Alternative names**: Temperate cyclones, frontal depression & Extra-tropical cyclones.
- **Area of origin**: between 30°-60° N/S of latitudes.
- **Evidence**: consists of cold front and warm front.
- **General direction**: move from west to east (eastward).
- **Reason for movement**: steered (driven) by westerlies.
- **Circulation**: clockwise (SH); anticlockwise (NH).
- **Pressure belt**: westerly wind belt.

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- **Mainly affected areas**: southwestern part e.g. Cape Town.
- **Season mainly affecting:** Winter
- **Size:** diameter about 1000 km.

Areas of formation



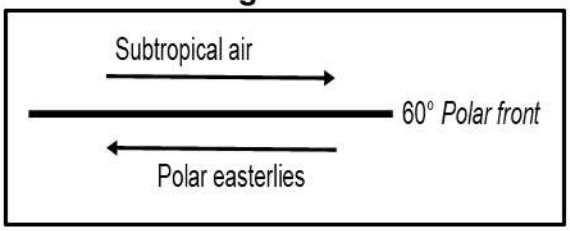
[Source: Own sketch]

CONDITIONS NECESSARY FOR FORMATION

- Two air masses (warm subtropical air and cold polar air) meet at the polar front.
- Subtropical westerlies blow from 30°N/S and polar easterlies blow from 90° N/S– towards the polar front (60° N/S).
- These two air masses move parallel to each other in opposite directions.
- Frictional drag between them causes them to interact due to: temperature differences between the land and sea surface, differences in wind speed and uneven surface over which they move.

Stages of development in the southern hemisphere

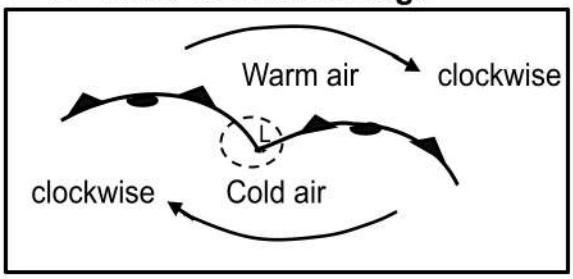
1. Initial stage



[Source: Adapted from Grade 12 Excel guide]

- Warm subtropical air (westerlies) and cold polar air (easterlies) meet at the polar front.
- The air masses move parallel to each other due to the Coriolis force that deflects winds to the left.

2. Wave formation stage

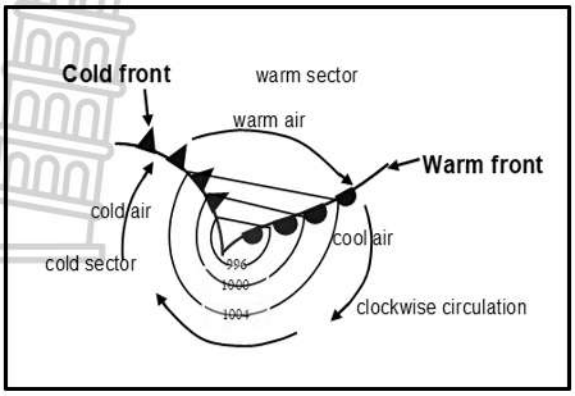


[Source: Adapted from Grade 12 Excel guide]

- Frictional drag takes place between the contrasting two air masses.
- Cold air starts to uplift a wedge of warm air.
- Cold and warm fronts start forming as air converge towards the low-pressure centre in a clockwise circulation.

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3. Mature stage



[Source: Own sketch]

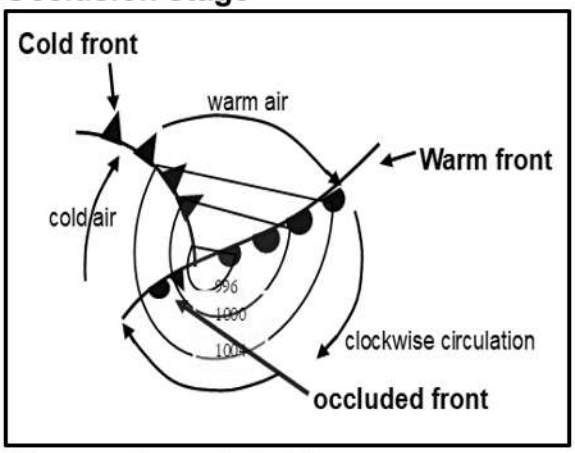
- The wave intensifies in this stage.
- Isobars are close to each other (steep pressure gradient) and point away from the low pressure.
- Cold and warm fronts are well developed.
- The fronts form a V shape at the centre.
- Cold and warm sectors are also developed.
- Intense weather is experienced in this stage.
- Cooling, condensation, formation of cumulonimbus clouds occur due to the rising air.
- Heavy rainfall which is accompanied by lightening, thunderstorms and strong winds develop.

Linking stage to weather conditions



[Source: Adapted from https://tse4.mm.bing.net]

Occlusion stage

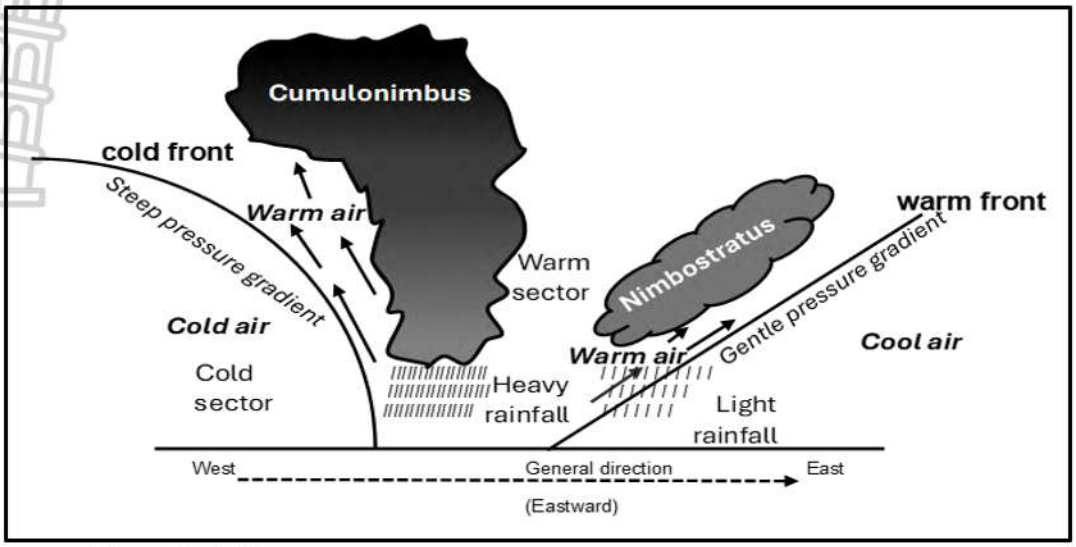


[Source: Own sketch]

- Occlusion stage is when the cold front catches up with the warm front at the apex.
- The cold air is dense, so it moves faster than the cold air.
- There are two types of occlusions: cold front occlusion and warm front occlusion
- Cold front occlusion occurs when the coldest air behind the cold front forcing warm air to be uplifted (cold front undercuts the warm front).
- Warm front occlusion occurs when the coldest air is ahead of the warm front causing cold air to be uplifted.

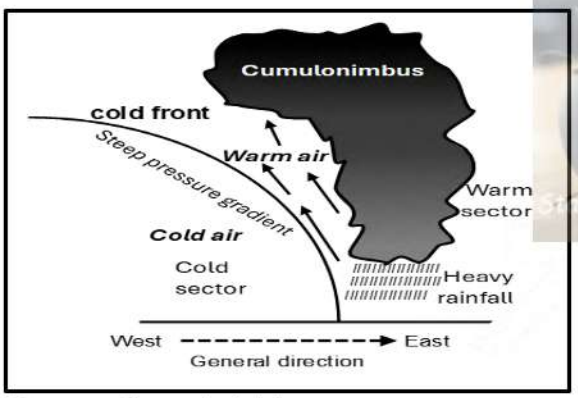
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Cross-section through a midlatitude cyclone



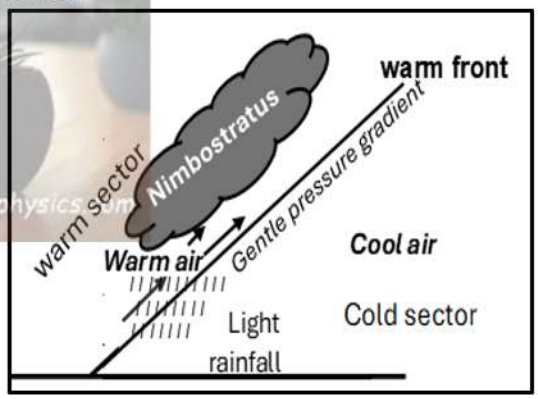
[Source: Own sketch]

Cross-section through a cold front



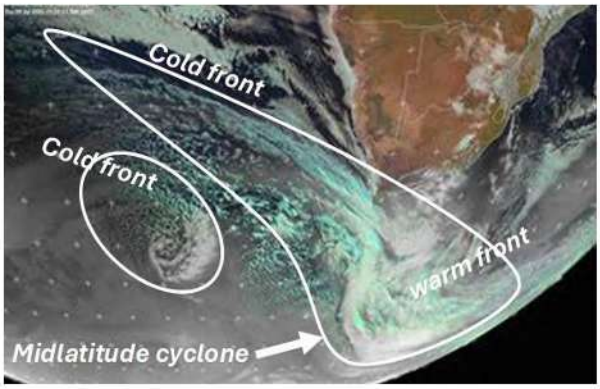
[Source: Own sketch]

Cross-section through a warm front



[Source: Own sketch]

Weather changes brought by the passage of a midlatitude cyclone/ cold front



[Source: Adapted from https://watchers.news/wp-content]

- Temperature drops due to cold approaching air.
- Air pressure increases due to a drop in temperature.
- Strong gusty winds due to steep pressure gradient.
- Humidity decreases as cold air holds little water vapour.
- Cumulonimbus clouds form due to rising warm air.
- Lightning and thunderstorms due to cooling and condensation

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- Heavy rainfall (precipitation) due to cumulonimbus clouds.

Impact of midlatitude cyclones/ cold front



[Source: Adapted from https://tse2.mm.bing]



[Source: Adapted fromhttps://tse3.mm.bing.net]



[Source: Adapted from https://news24]

Socio-economic positive impact

- Cold front brings winter rainfall to the Southwestern Cape, which is ideal for vineyards and deciduous fruit farming.
- Heavy rainfall fills dams with water which is favorable for irrigation/ livestock farming.
- Heavy rainfall fills dams and rivers which boosts domestic and industrial use.
- Snowfalls over mountains attract tourists.

Socio-economic negative impact

- Heavy rainfall causes floods that wash away crops and livestock.
- Heavy rainfall causes floods which increase insurance claims e.g. cars.
- Lightening and heavy rainfall (floods) kill livestock and property
- Strong winds may blow away property e.g. settlements.
- Strong winds uproot trees and block infrastructures such as roads.
- Strong winds and storm surges pose a hazard to fishermen and coastal areas.

Physical (environmental) positive impact

- Heavy rainfall fills rivers which stabilizes biodiversity
- Heavy rainfall boosts the growth of vegetation

Physical (environmental) negative impact

- Heavy rainfall causes floods that erode topsoil.
- Floods disrupt ecosystems.

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	○ Heavy rainfall causes mudslides and rock falls.

Precautionary and management strategies

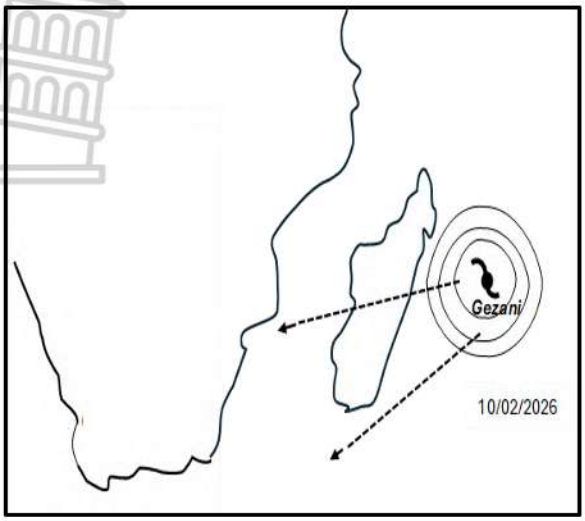
- Moving from low-lying grounds to high-lying areas to avoid floods.
- Livestock should be kept in an enclosed area to prevent losses during severe snow.
- Regular checks on drainage systems to reduce the effect of floods.
- Farmers should stock enough grain and fodder to prevent livestock loss.
- Regular awareness through media, to track the severity of the system.
- Rescue teams (i.e. ambulances) should be on high alert in cases of a weather hazard.
- Stock up essentials (batteries, food etc.) timeously to prevent extended impact
- Moving affected people to community halls to prevent further damage.

TROPICAL CYCLONES

KEY CONCEPTS	DEFINITION
Tropical cyclone	Small intensely developed low pressure system associated with severe storms and heavy winds occurring between 5°-25° N/S.
Vortex	A spiral motion of air around the centre of a tropical cyclone.
Eye	The calm centre of a tropical cyclone.
Eyewall	Area around the eye with intense weather such as cumulonimbus clouds, heavy rainfall and high wind speed .
Dangerous semi-circle (Forward left-hand quadrant)	The south-western part of a tropical cyclone with intense weather (highest wind speed, severe lightening and storms).
Latent heat	This is hidden heat released during condensation which contributes to unstable air.
Storm surge	Abnormal rise to sea level, along the coast as a result of onshore winds.

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A tropical cyclone



[Source: Own sketch]

GENERAL CHARACTERISTICS

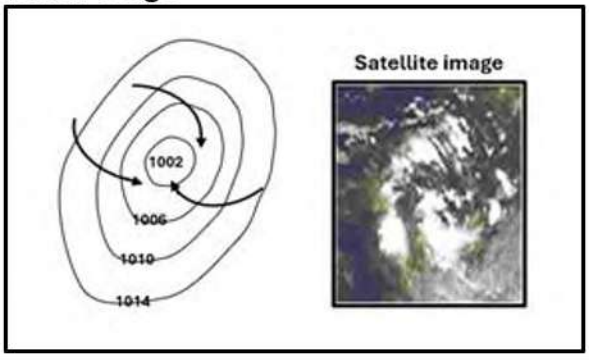
- **Regional names**: Hurricane (North America); Willy Willies (Australia); Typhoons (S.E Asia); Cyclones (India & Mauritius).
- **Named alphabetically**: e.g. Gezani, a 7th Tropical cyclone.
- **Area of origin**: between 5°-25° N/S of latitudes.
- **Evidence**: well developed eye, given name.
- **General direction**: move from east to west (westward).
- **Reason for movement**: steered by easterlies.
- **Circulation**: clockwise (SH) and anticlockwise (NH).
- **Pressure belt**: easterly wind belt.
- **Season mainly affects**: Summer/ early Autumn.
- **Size**: diameter of 300-500 km.

Conditions necessary for the formation of Tropical cyclones

- Sea surface temperature above 26.5°C promotes high evaporation rates/ release of latent heat.
- 5°-25° of latitudes enables the Coriolis force to be stronger, allowing for the deflection of winds.
- Unstable atmospheric conditions enable the convection of air and release of latent heat.
- Calm conditions promote the convergence of air and formation of cumulonimbus clouds.
- Upper air divergence maintains a low pressure and promotes convergence of air.

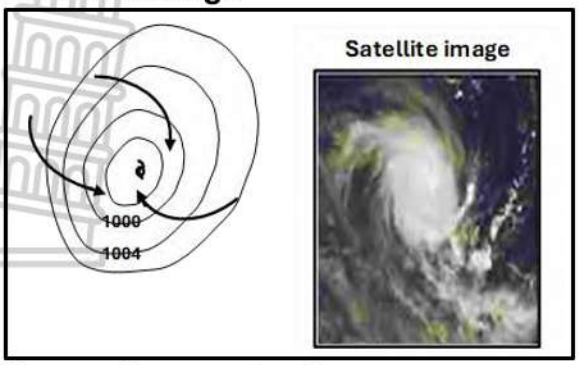
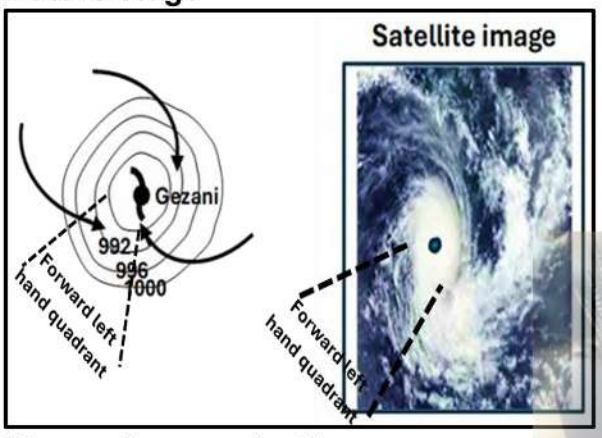
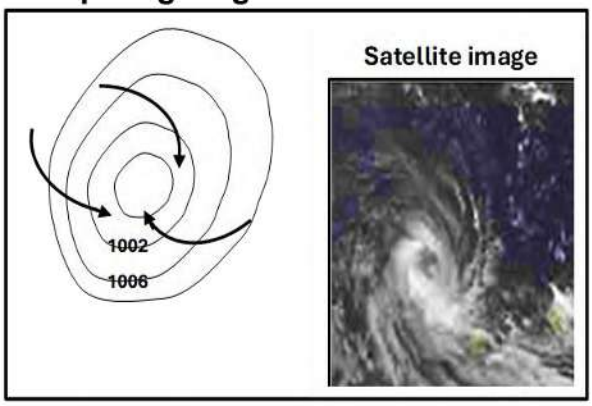
Stages of development in the southern hemisphere

Initial stage



- Pressure is above 1000 mb at the centre.
- Isobars are widely open.
- Warm air converges towards the centre for the eye to begin to form.
- Light rain as a result of cumulus and cirrus clouds.
- Gale force winds up to 50km from the eye.

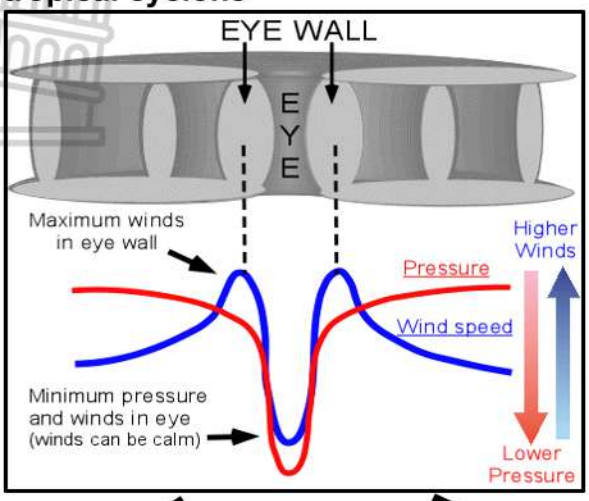
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[Source: Own construct]	
Immature stage  [Source: Own construct]	○ Pressure drops to below 1000 mb at the centre. ○ Eye intensifies as air continues to converge and rise in a spiral clockwise circulation. ○ Winds reach hurricane strength. ○ Cumulonimbus clouds form around the eye. ○ The system is about 100km in diameter.
Mature stage  [Source: Own construct]	○ Pressure is well below 1000 mb at the centre. ○ Isobars are close (steep pressure gradient) ○ Winds are at hurricane strength (120+ km/h ○ Dangerous semi-circle (Forward left-hand quadrant) on the south-western part experiences intense weather (strong winds, cumulonimbus clouds, lightning & thunderstorms, torrential rainfall and storms). ○ Diameter is about 300-500 km. ○ Severe impact is experienced as the system moves closer to eastern continents.
Dissipating stage  [Source: Own construct]	○ Pressure begins to increase to above 1000 mb at the centre. ○ The dissipating stage occurs when: ➢ The systems move **over the land** where there is less moisture. ➢ There is **friction** over the land which decreases wind speed. ➢ The system enters **cold oceans** as moisture supply is reduced. ➢ The system is in a path of an advancing **cold front**.

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Weather associated with the mature stage of the tropical cyclone

Wind and pressure in parts of the tropical cyclone



Category 5 Tropical cyclone's impact



[Source: https://tse3.mm.bing]

As the tropical cyclone approaches

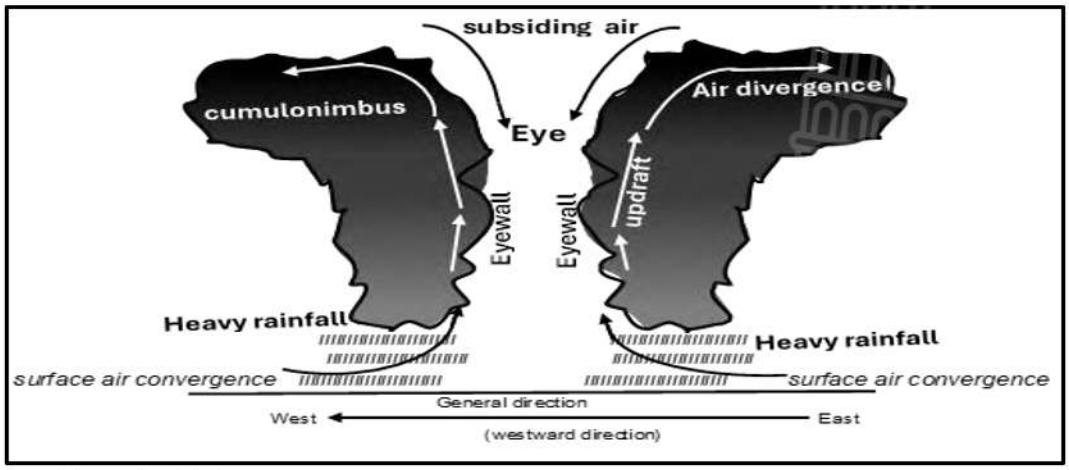
- Air pressure decreases.
- Wind speed increases (120+ km)
- Towering cumulonimbus clouds.
- Lightning, thunderstorms, hail and torrential rainfall.

In the eye of the tropical cyclone

- Calm weather (no wind)
- Clear skies (no rain)
- Lowest air pressure
- Subsiding air
- These weather conditions are because of the upward spiral movement of air that creates an artificial wall around the centre
- Therefore, surface air is prevented from rising and condensing leading to cloudless and calm conditions.

NB: Tropical cyclones are classified according to categories i.e. category 1 to category 5. Accompanying weather describes the category of the cyclone. For example, Category 5 tropical cyclone Gezani records wind speeds of 175km/hr. with severe lightning and thunderstorms and heavy rainfall of 200mm.

Cross section through a tropical cyclone



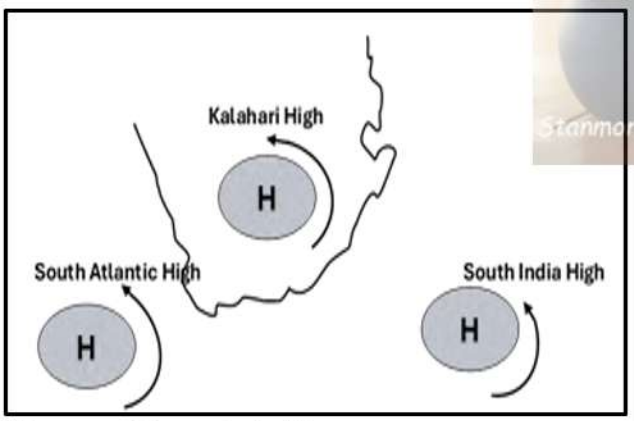
[Source: Own sketch]

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SUBTROPICAL ANTICYCLONES AND RESULTANT WEATHER OVER S.A.

KEY CONCEPTS	DEFINITION
Ridge	Elongated isobars on a high-pressure cell.
Trough	Elongated isobars on a low-pressure cell.
Saddle	Zone of constant pressure between two cyclones or anticyclones.
Temperature inversion	Increase in temperature with an increase in height (altitude)
Inversion layer	Layer of warm air trapped between cold air.
Line thunderstorms	Thunderstorms arranged in a line along a trough of low pressure over the interior in Summer.
Moisture front	A boundary between two air masses with different moisture content.
Berg wind	Hot, dry and gusty winds blowing from the interior of the country down the escarpment to the coast in Winter

Three high pressure cells



[Source: Own sketch]

NB: The South Atlantic High and South Indian high shift northerly in Winter and southerly in Summer as they migrate with the apparent movement of the sun.

South Atlantic High-pressure cell
- Located on west coast of SA
- Produces clear, dry & stable weather conditions
- Precipitation: fog and mist
- Rides to divert moist air from the Indian Ocean into the land.

Kalahari High-pressure cell
- Located over the interior in winter
- Interact with coastal low to form berg winds.

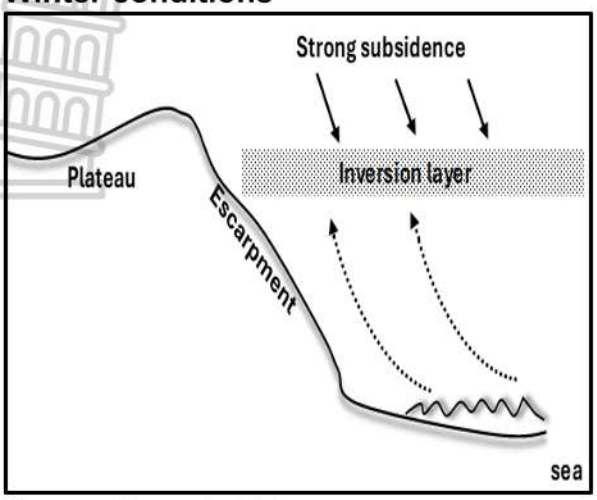
South Indian High-pressure cell
- Located off the east coast.
- Called the blocking high when on the path of advancing midlatitude cyclone

When isobars elongate outward of these cells, they form a ***ridge***.

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Influence of anticyclones on South Africa's weather and climate: The Plateau

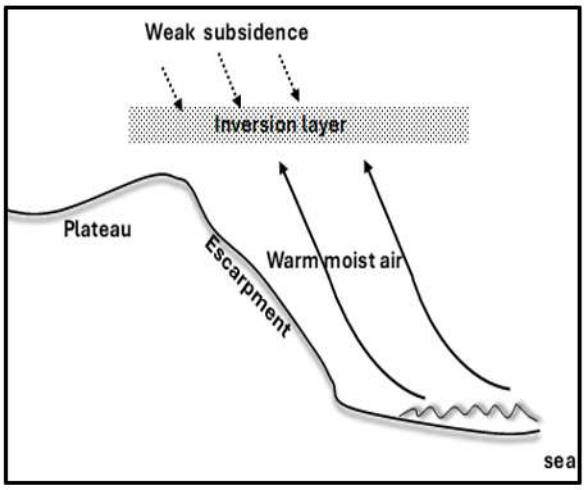
Winter conditions



[Source: Own sketch]

- Kalahari High is well developed over the interior due to low temperatures.
- There is a strong subsidence of cold air.
- Strong subsidence pushes the inversion layer below the escarpment.
- Moist air ridging from over the Indian Ocean is prevented from penetrating the plateau.
- This leads to little or no rainfall occurring in Winter.
- Associated with clear, stable and dry conditions that prevail over the interior.

Summer conditions



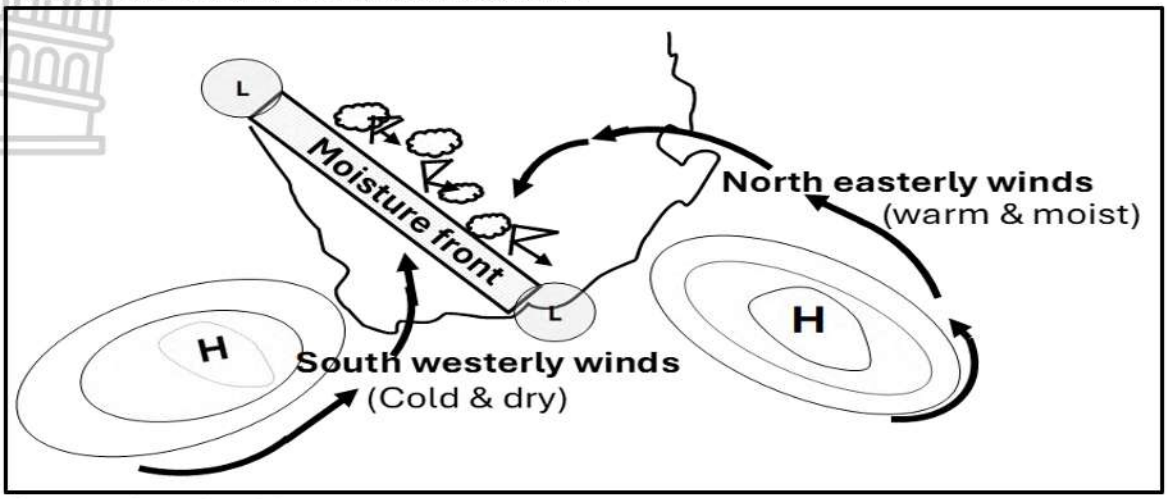
[Source: Own sketch]

- Kalahari High shrinks (weakly develops) due to high temperatures.
- Less subsidence of cold air.
- This less subsidence allows the inversion layer to shift above the escarpment.
- Moist air ridging in from the Indian Ocean is carried over the escarpment onto the plateau.
- This leads to more rainfall occurring in Summer.
- Associated with unstable widespread rains that prevail over the interior.

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Development of travelling disturbances associated with anticyclonic circulation

Moisture front and line thunderstorms



[Source: Own sketch]

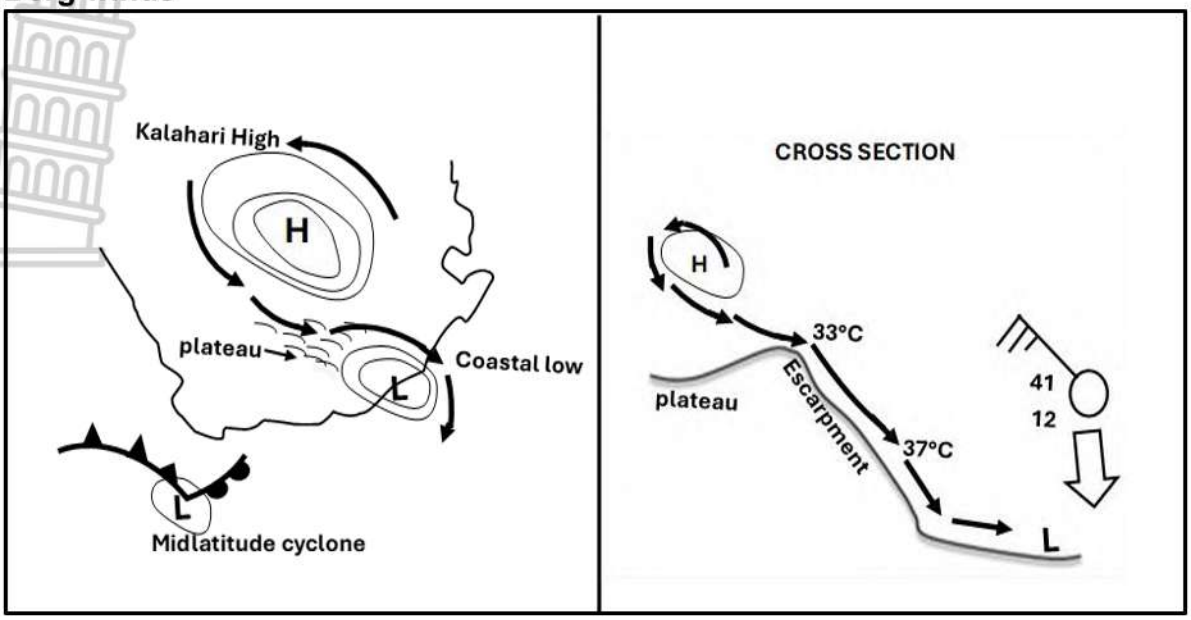
How do line thunderstorms develop?

- The moisture front is positioned from northwest to southeast.
- It is a boundary between the southwesterly winds and north easterly winds.
- These two winds (contrasting air masses) meet at this boundary.
- The south westerly winds which are cold and dry meet with the northeasterly winds at the moisture front.
- The south westerly winds sink as they heavy and dense.
- As they sink, they force the northeasterly winds (light) to rapidly rise along the east of the moisture front.
- As they rise, the air cools, condenses (form cumulonimbus clouds).
- Lightning occurs along with line thunderstorms; then heavy rainfall occurs –all on the east of the moisture front.
- Therefore, line thunderstorms occur in Summer.
- Line thunderstorms often result to flash floods.

Impact of line thunderstorms on farmers	Strategies to reduce the impact of line thunderstorms
○ Torrential rain, lightning and winds damages crops & livestock. ○ Floods wash away fertile soil. ○ Loss of profits due to loss of crops and livestock. ○ Access of water for irrigation. ○ More water is potentially used for hydro electricity generation. ○ Aquaculture is boosted.	○ Evacuation plans for people and livestock. ○ Have enough grain and fodder. ○ Store seed and feed in safe place ○ Educational programmes for farmers. ○ Sandbagging method/ afforestation to prevent erosion. ○ Mulching young plants.

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Berg winds



How do berg winds develop?

- Berg winds occur during Winter.
- Both the Kalahari High and coastal low are required for the development of berg winds.
- Air diverges in an anticlockwise circulation around the Kalahari High towards the coastal low-pressure cell.
- As air descends the escarpment, it heats up adiabatically (DALR– 1°C per 100m).
- The hot winds (offshore) raise temperatures of coastal areas.
- These winds are hot (they heat up adiabatically as they descend the escarpment) and dry (they originate from the interior where there is little moisture).
- Areas at the coast will have station models with high temperatures and clear skies due to hot and dry winds blowing down the escarpment.

The effects of berg winds and veld fires

- Berg winds trigger veld fires– vegetation becomes dry and easily catch fires.
- This is because in Winter, there is less moisture and little rainfall.
- **Socio-economic impact**: respiratory problems, workers become lethargic, domestic animals face unbearable heat.

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- **Environmental and social impact**: veld fires– destroy ecosystems, soil erosion, increased evaporation from rivers, destroy crops and livestock, loss of income, injury or loss of life; damage to property.

Strategies to reduce the impact of berg winds

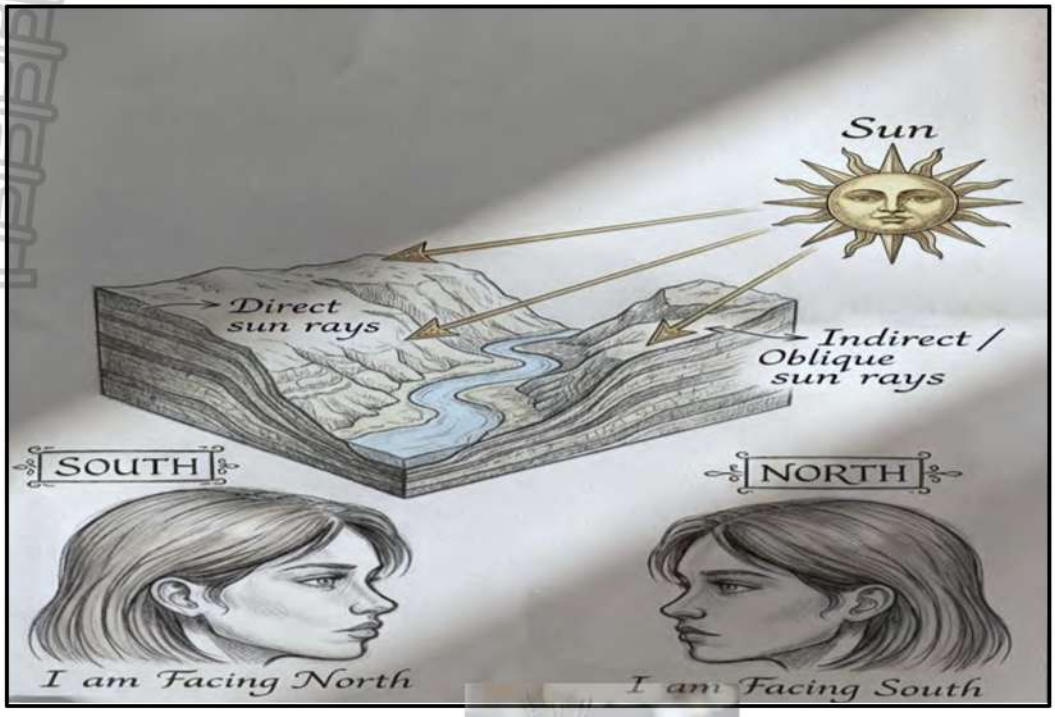
- Awareness campaigns and educating people on how veld fires spread.
- Access to media to track berg wind conditions.
- Using sprinklers to stop veld fires from burning crops etc.
- Fire fighters must be on standby.
- Watch towers to scan for fires.
- Moving animals in a shelter/enclosed area to avoid heat stroke.
- Establishing fire breaks on prone areas.

VALLEY CLIMATES

KEY CONCEPT	DEFINITION
Slope aspect	The direction in which a slope faces in relation to the sun's rays.
Valley climate	Local climate occurring in valleys.
Local climate	Climate occurring over a smaller area.
Microclimate	Climate occurring over a smaller area.
Katabatic wind	Wind that blows down the slope during the night.
Anabatic wind	Wind that blows up slope during the day.
Radiation fog	Fog forms in valleys during the night when temperature drops below dew point temperature.
Frost	Frost forms at the bottom of the valley when temperature drops below freezing point.
Frost pocket	The area at the valley floor where frost collects.

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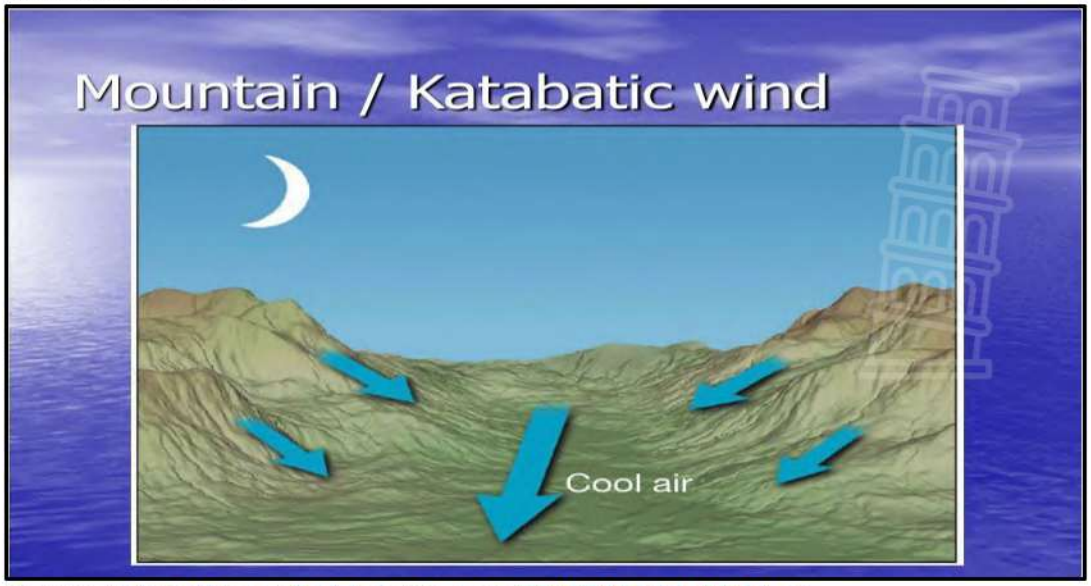
Slope aspect



[Source: Gemini]

Southern hemisphere	Northern hemisphere
North facing slope receives direct sunlight hence it is warmer.	South facing slope receive direct sunlight hence it is warmer.
South facing slope receives indirect / oblique sunlight hence it is cooler.	North facing slope receive indirect / oblique sunlight hence it is cooler.

Katabatic winds

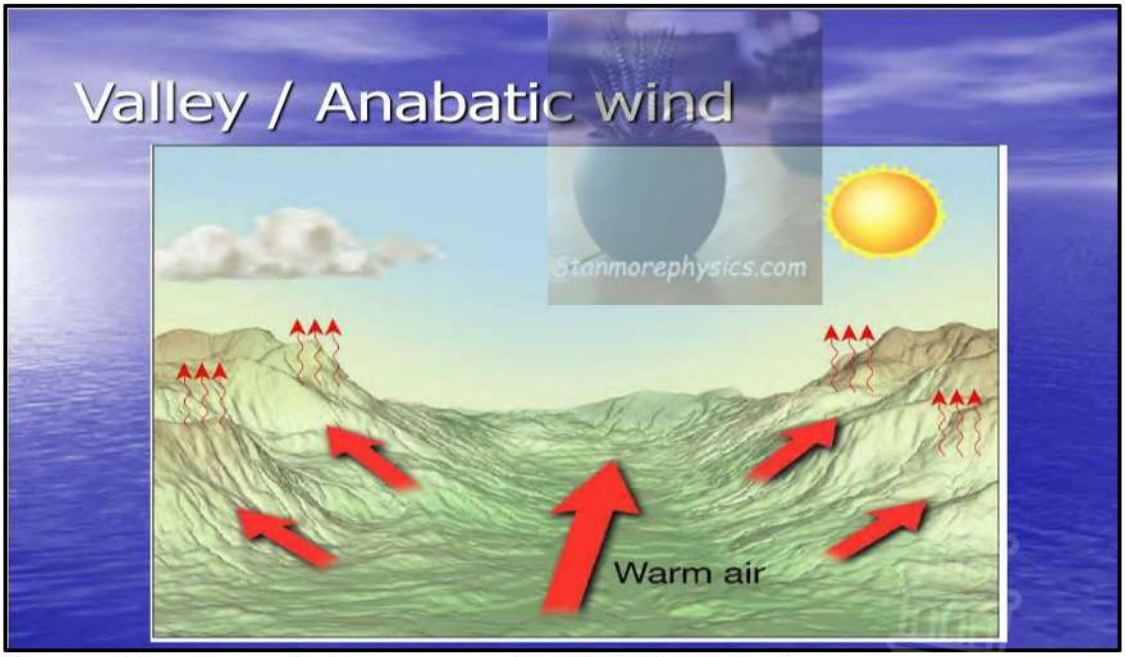


[Source: https://image3.slideserve.com/6215210/slide10-l.jpg]

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- Katabatic winds develop during the night.
- Cold, heavy and dense air subsides down the slope due to force of gravity.
- Cold air accumulates at the valley floor and cools to below freezing point leading to ***frost***.
- When temperature cools below dew point temperature, it leads to ***radiation fog***.
- Warm air is trapped between cold air. The accumulation of warm air midway up the valley floor is called the ***thermal belt***.
- Pollutants will be trapped in the valley
- These valley winds have an influence on farming, settlement and transport.

Anabatic winds



[Source: https://image3.slideserve.com/6215210/slide7-l.jpg]

- Anabatic winds occur during the day.
- Warm and light air blows up the valley.
- They are significant as they disperse all the pollutants that were trapped during the night

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Influence of katabatic winds on people



[Source: Gemini]

- Pollutants can be trapped in the valley resulting in respiratory diseases such as asthma.
- When smoke mixes with fog it results in ***smog*** and it may result in acid rain
- Farmers will choose the warmer slope or the middle part of the slope for deciduous fruits since they require warm temperatures to ripen and sweeten.
- Citrus fruits are cultivated on the slope that receives indirect sunlight or at the bottom of the valley.
- Frost resistant crops such as tubers are cultivated at the bottom of the slope.

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URBAN CLIMATE



[Source: Gemini]

- Pollution dome refers to accumulation of pollutants trapped above the city
- Urban heat island refers to higher temperatures in urban areas as compared to rural surroundings.
- Urban heat island is caused by a combination of factors including geometric shape of buildings, artificial surfaces, urban activities, building density, efficient drainage system as well as higher population in urban areas.

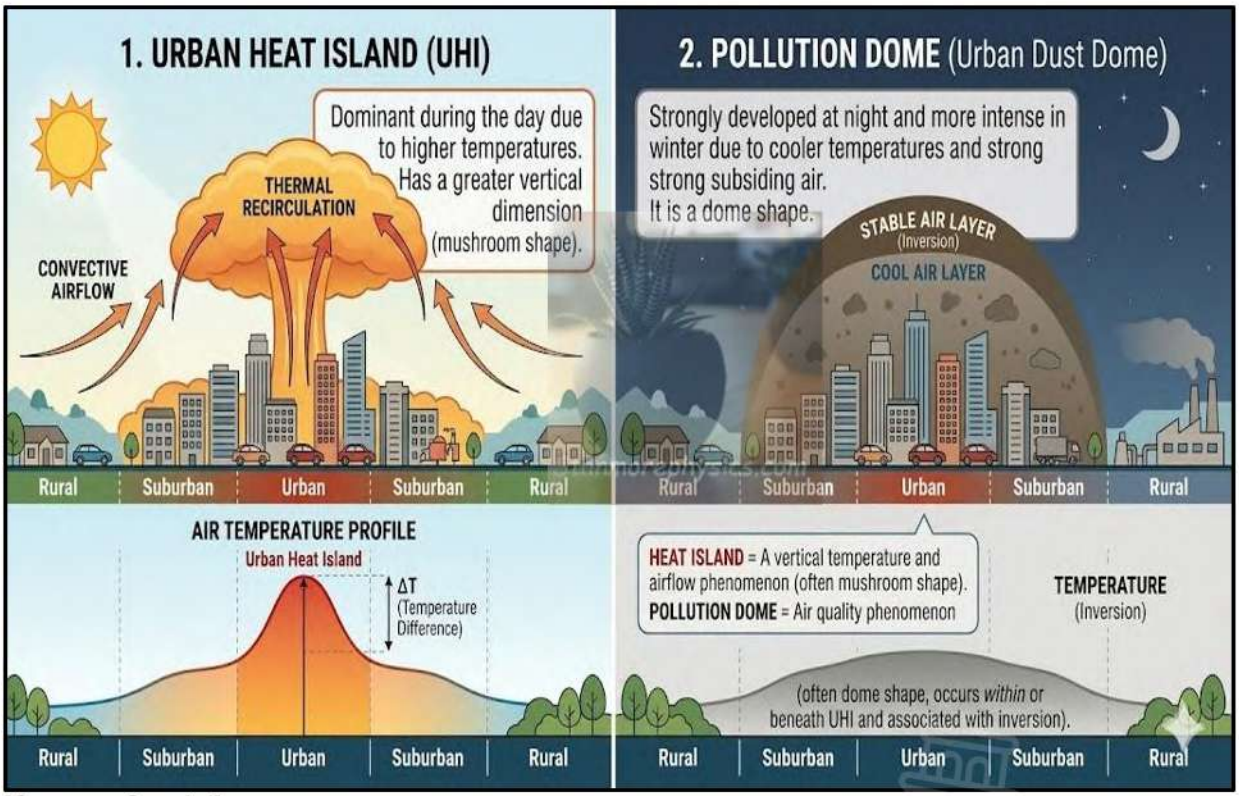
General differences

Climate element	Urban vs rural	reasons
Cloud cover	More clouds in cities	Higher levels of pollution result in more condensation nuclei.
Precipitation	More rain in cities	More clouds will result in higher rainfall.
Relatively humidity	Low in cities	Lack of vegetation and water bodies in urban areas limit evaporation.
Wind speed	Lower in cities	Buildings obstract air flow but at the same time increases turbulance.
Temperature	Higher in cities	Geometric shape of buildings, artificial surfaces, urban activities, building density, efficient drainage system and higher population.

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Effect of urban heat island	Effect of pollution dome
○ Can cause heat stress. ○ Eye irritation. ○ Skin disorders ○ Heart diseases that may lead to death. ○ May contribute towards global warming.	○ People may suffer from respiratory diseases. ○ Results in acid rain that can affect growth of plants and corrode buildings. ○ Smog reduces visibility thus accidents.

Comparing urban heat isand and pollution dome



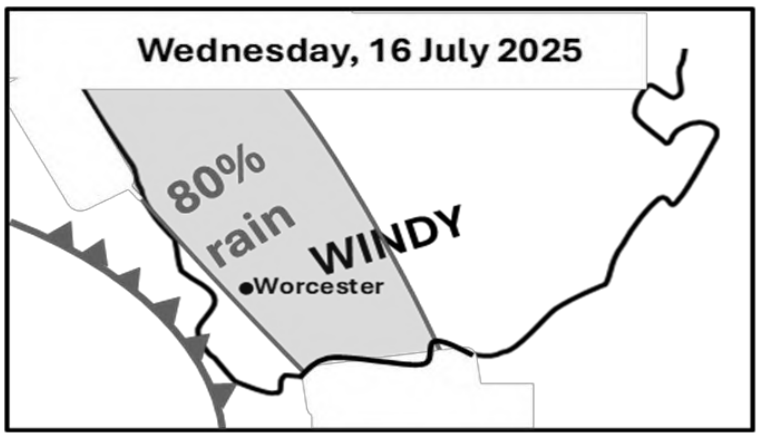
[Source: Gemini]

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ACTIVITIES: CLIMATE AND WEATHER

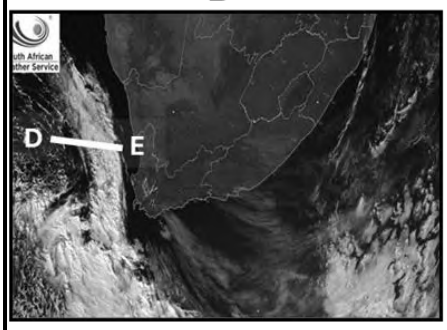
1.1 Refer to the sketches below on a midlatitude cyclone.

A



[Source: Examiner's own sketch]

B



[Source: Adapted from https://pbs.twimg.com

C



[Source: https://ichef.bbci.co.uk]

	1.1.1	Describe the weather condition (evident in sketch **A**) that was because of steep pressure gradient.	(1 x 2)	(2)
	1.1.2	Draw a fully labelled cross section of the cold front (**D-E**) in the satellite image at **B**.	(4 x 1)	(4)
	1.1.3	Explain why an 80% chance of rain was experienced in Worcester because of the passage of the cold front.	(2 x 2)	(4)
	1.1.4	How would the satellite image (sketch **B**) have assisted residents to avoid ending up stranded on the rooftops, as shown in photograph **C**.	(2 x 2)	(4)
	1.1.5	Explain why the impact of a cold front is often severe on people whose settlements are located on low-lying areas.	(3 x 2)	(6)

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1.2 Refer to the infographic on Tropical Cyclone Gezani.

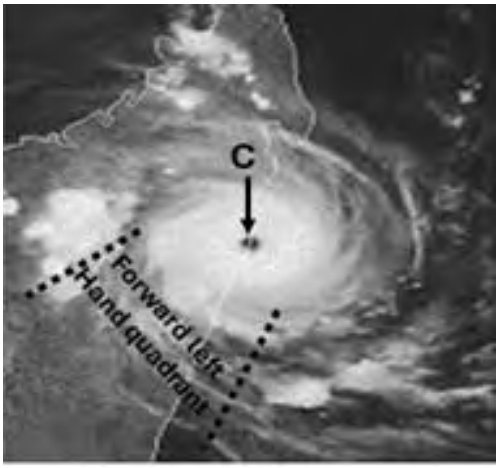
TEXT ON TROPICAL CYCLONE GEZANI

The system formed on 5 February in the Indian Ocean off Madagascar's north-eastern coast and intensified into sustained winds of 121 mph, equivalent to a category 3 Hurricane. By the afternoon of 10 February, the cyclone was tracking westward, likely to impact negatively on the residents of Madagascar. It was expected to continue intensifying rapidly and could reach category 4.

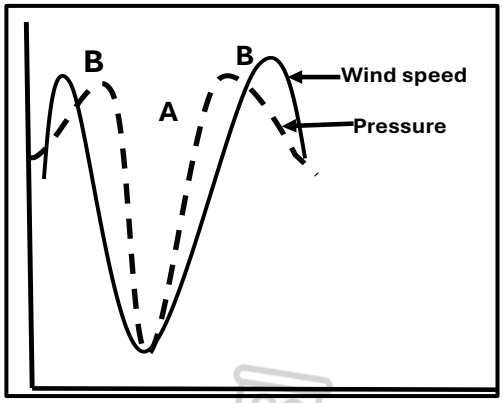
PHOTOGRAPH: SOCIAL IMPACT CAUSED BY TROPICAL CYCLONE GEZANI



SATELLITE IMAGE: GEZANI



GRAPH SHOWING WIND SPEED AND PRESSURE



[Examiner's own sketch]

[Source: Adapted from https://static.independent.co.uk/2026]

	1.2.1	Is the part of Tropical Cyclone Gezani at **C** (in the satellite image) correctly matching **A** or **B** in the graph?	(1 x 1)	(1)
	1.2.2	Account for the highest wind speed at **B**, as shown in the graph.	(1 x 2)	(2)
	1.2.3	Refer to the text. Why was Tropical Cyclone Gezani expected to intensify to a category 3 tropical cyclone?	(2 x 2)	(4)
	1.2.4	Explain how the forward left-hand quadrant of Tropical Cyclone Gezani in the satellite image caused the social impact evident in the photograph.	(2 x 2)	(4)

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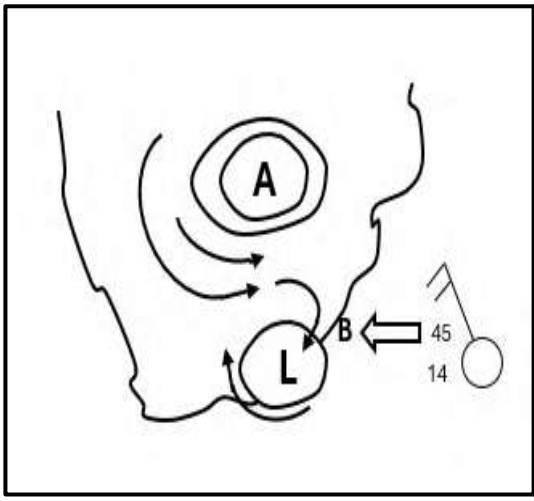
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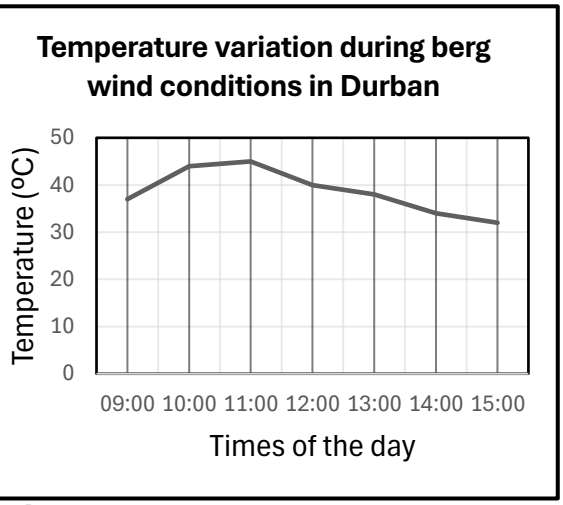
1.3 Refer to the infographic on berg winds.

BERG WINDS SWEEP THROUGH DURBAN CITY

The South African Weather Service (SAWS) said certain parts of KwaZulu-Natal would experience extremely hot conditions, causing high levels of discomfort. SAWS said although these temperatures were usually associated with heatwaves, today's heat was a result of berg winds with "high discomfort values ranging from 35-45 degrees Celsius expected". According to SAWS, people and animals may experience heat stroke or heat exhaustion with prolonged exposure.

[source: https://capeargus.co.za/news/environment/2023-02-20-watch-durban-hits-41c-as-berg-winds-sweep-through-city/]





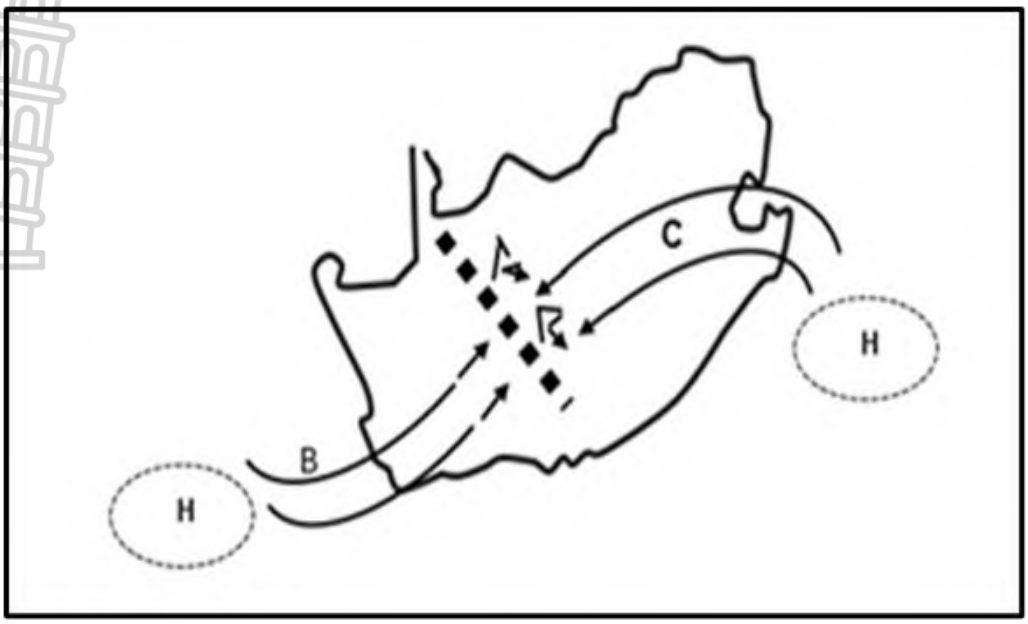
[Source: Examiner's own sketches and constructs]

	1.3.1	According to the text, what is the impact of berg winds on people and animals.	(1 x 1)	(1)
	1.3.2	Describe the general temperature trend after 11:00 as shown in the graph.	(1 x 2)	(2)
	Refer to the synoptic weather map above.			
	1.3.3	Name the pressure cell labelled **A**.	(1 x 1)	(1)
	1.3.4	Account for the clear sky conditions at station model **B**.	(1 x 2)	(2)
	1.3.5	Why are emergency services such as ambulances and fire brigades on high alert when berg winds occur?	(2 x 2)	(4)
	1.3.6	In a paragraph of approximately EIGHT lines discuss strategies that Durban residents can implement to reduce the negative social effects of berg winds.	(4 x 2)	(8)

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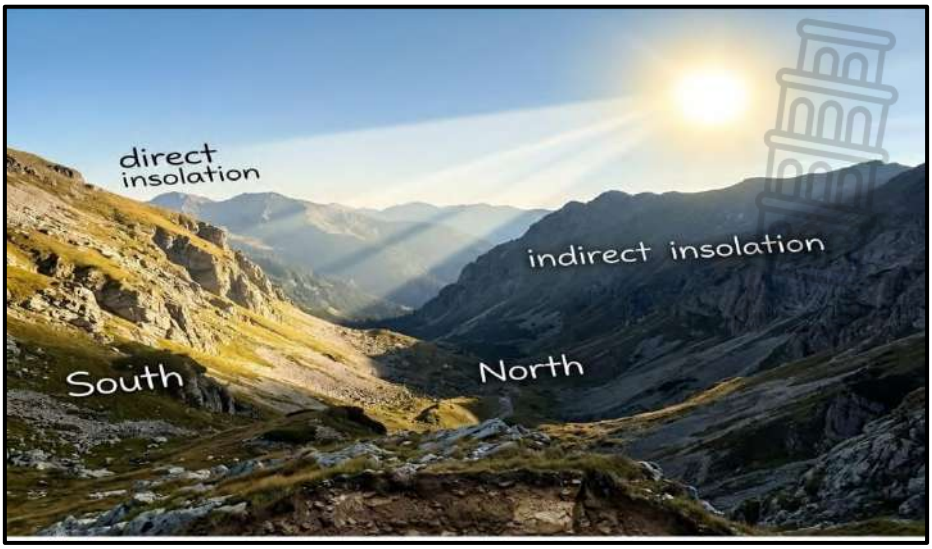
1.4	Refer to the sketch online thunderstorms.			



[Source: Examiner's own sketch]

	1.4.1	Define the concept *moisture front.*	(1 x 2)	(2)
	1.4.2	Why does the wind at **B** sink along the moisture front?	(1 x 2)	(2)
	1.4.3	Explain how the winds at **C** end up causing line thunderstorms over the interior of South Africa.	(2 x 2)	(4)
	1.4.4	In a paragraph of approximately EIGHT lines, discuss the positive impact of line thunderstorms on farming activities.	(4 x 2)	(8)

1.5	Refer to the photograph on slope aspect.

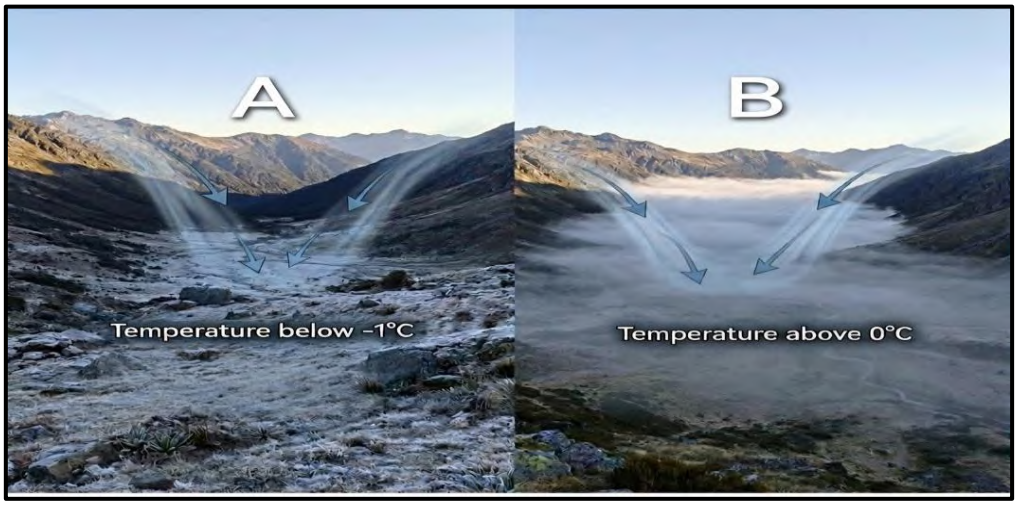


[Source: Gemini]

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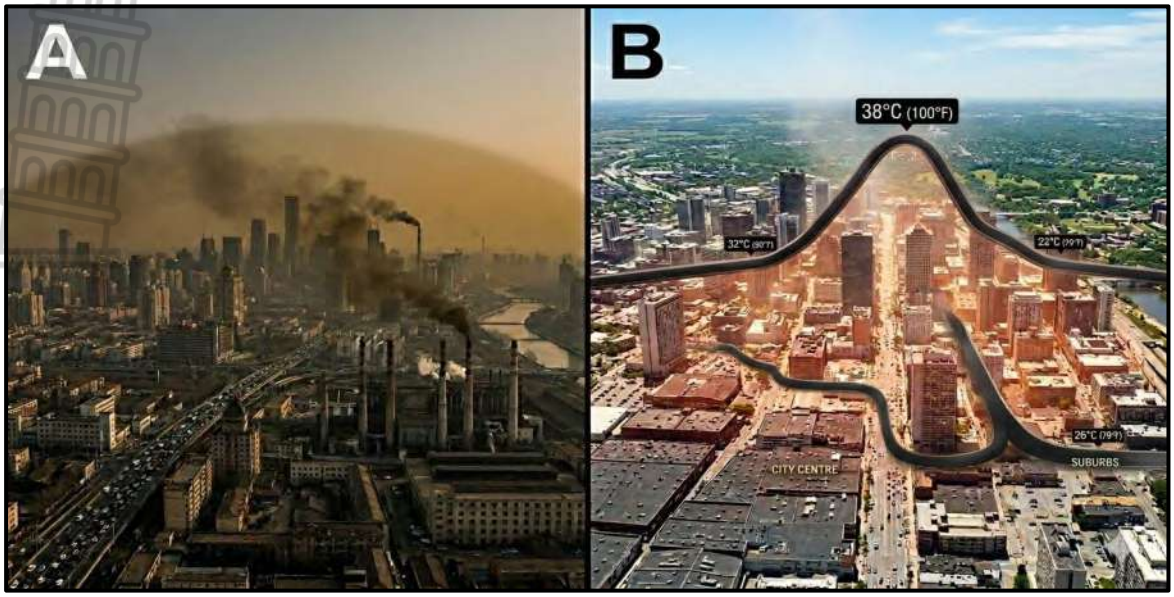
1.5.1	Define the concept *slope aspect.*	(1 x 2)	(2)
1.5.2	Provide evidence from the photograph that the slopes are in the southern hemisphere.	(2 x 2)	(4)
1.5.3	Explain how slope aspect influences land values in the southern hemisphere.	(2 x 2)	(4)
1.5.4	Explain how the south facing slope will influence the consumption of electricity.	(2 x 2)	(4)

1.6	Refer to the photograph on a valley wind.		
	 [Source: Gemini]		
1.6.1	Define the term *katabatic wind*.	(1 x 2)	(2)
1.6.2	Why does air subside in the photograph.	(1 x 2)	(2)
1.6.3	Account for the different types of precipitation experienced in photograph **A** and **B**.	(2 x 2)	(4)
1.6.4	Discuss the utilization of the different parts of the valley for farming activities.	(2 x 2)	(4)
1.6.5	Discuss strategies that farmers could implement at the bottom of the valley to curb (deal) with the extremely cold temperatures on their crops.	(3 x 2)	(6)

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1.7	Refer to the photographs on urban climate.



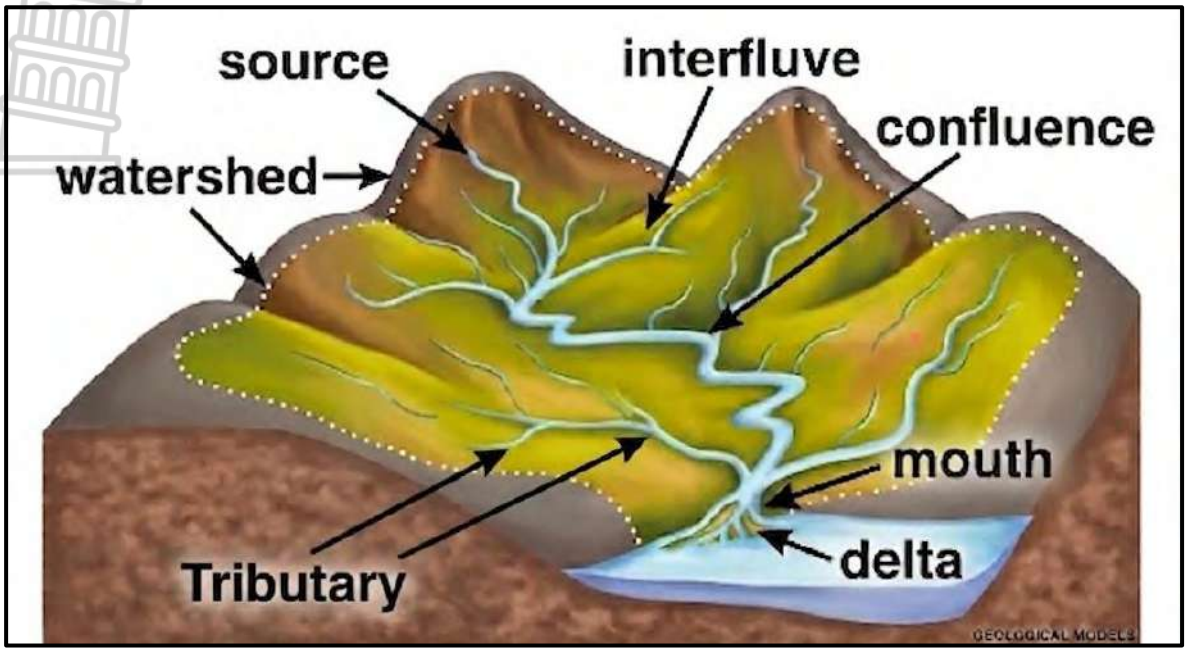
[Source: Gemini]

1.7.1	Define the concept *isotherm.*	(1 x 2)	(2)
1.7.2	Distinguish between the climatic phenomenon at **A** and **B.**	(2 x 2)	(4)
1.7.3	Why is the phenomenon at **A** more compressed during the night?	(2 x 2)	(2)
1.7.4	Why is the phenomenon at **B** more vertically formed during the day?	(2 x 2)	(2)
1.7.5	Explain the negative economic impact of phenomenon **A.**	(2 x 2)	(4)
1.7.6	In a paragraph of approximately EIGHT lines, explain the strategies that can be implemented to reduce the economic impact of phenomenon **A** and **B**.	(4 x 2)	(8)

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GEOMORPHOLOGY



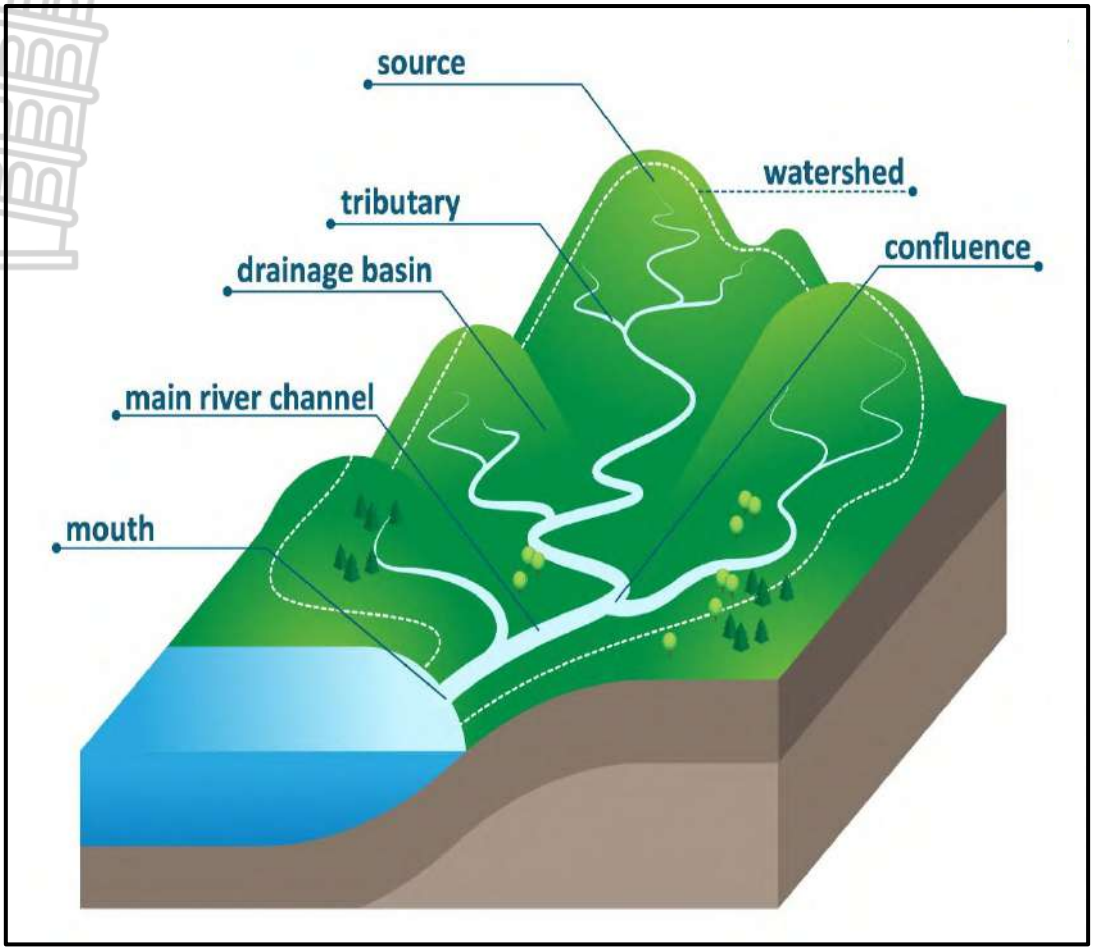
[Source: Gemini image]

KEY CONCEPTS	DEFINITION
Drainage basin	Area drained by the main river and its tributaries.
Drainage density	Measure of the total length of streams per unit area.
Drainage pattern	Arrangement of streams in a drainage basin.
Main river	River that flows from source to mouth.
Tributary	Smaller river that joins the main river.
River source	Point where a river originates/ begins.
River mouth	Point where a river enters the sea.
Watershed	High-lying area separating two drainage basins/ river systems
Interfluve	High-lying area separating rivers within the same drainage basin.
Confluence	Point where rivers meet.
River system	Main river with its tributaries.
Ground water	Water that is found under the ground.
Water table	The upper limit (level) of ground water.
Cross profile	View of the river from bank to bank.
Longitudinal profile	Side view of the river from source to mouth.
Ultimate base level	The lowest level to which a river erodes.
Temporary base level	A point where a river stops eroding for a while e.g. waterfall.
Surface run off	Water that runs on top of the earth's surface.
Infiltration	Water that seeps into the soil after rainfall.
Catchment area	Upper reaches of a river.

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Features of a drainage basin



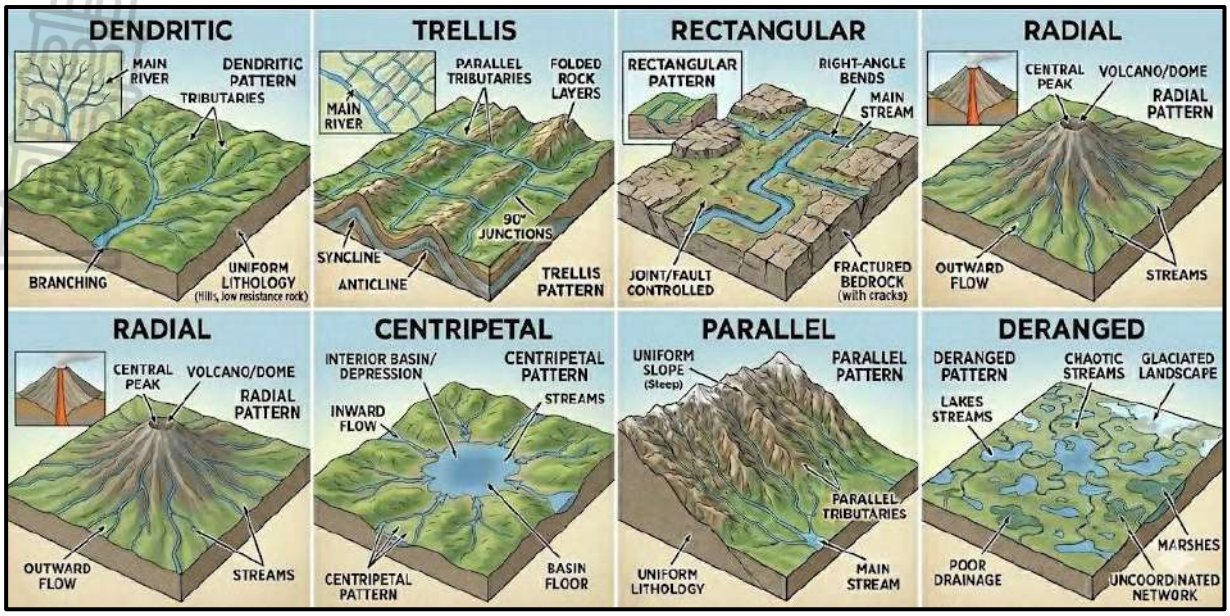
[Source: Gemini image]

2.1	Differentiate between the following terms:		
2.1.1	Watershed and interfluve	(2 x 1)	(2)
2.1.2	Source and mouth	(2 x 1)	(2)
2.1.3	River system and tributary	(2 x 1)	(2)
2.1.4	Drainage basin and river system	(2 x 1)	(2)
2.1.5	Surface run off and infiltration	(2 x 1)	(2)
2.1.6	Catchment area and water table	(2 x 1)	(2)

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Drainage patterns



[Source: Gemini]

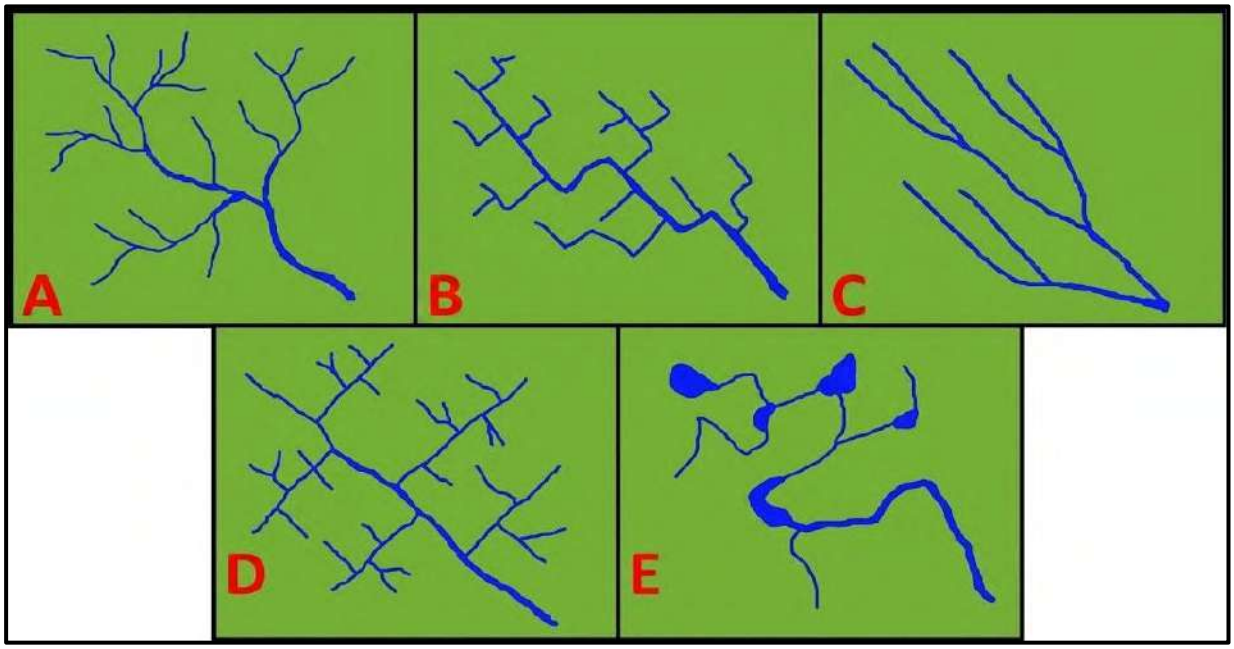
Pattern	Description	Rock types	Underlying rocks
Dendritic	It is a pattern that resembles branches of a tree	Sedimentary rocks and Igneous rocks	-Occurs on rocks that are uniformly resistant to erosion -Massive igneous rocks and horizontal sedimentary rocks
Trellis	-It is a pattern with tributaries joining the main river at right angles. -It has main streams that are parallel to each other	Sedimentary rocks	-Rocks with varying resistance to erosion. -Found in fold mountains -Found in areas with inclined strata
Rectangular	-The main streams have 90°bends. -The tributaries join the main river at 90°	Sedimentary rocks and Igneous rocks	Rocks with many joints
Radial	-Rivers flow away from a central point. -Resembles spokes of a wheel	Igneous rocks	Domes
Centripetal	-Rivers flow towards a central point. -Associated with lakes, a pan or a basin.	Igneous rocks	Massive igneous rocks
Parallel	-Streams are parallel to each other		-Rocks with major faults

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			-Steeply folded bedrock
Deranged	It has a haphazard pattern. -Associated with many lakes and swamps.		Areas that are geologically young

2.2	Refer to the drainage patterns below.



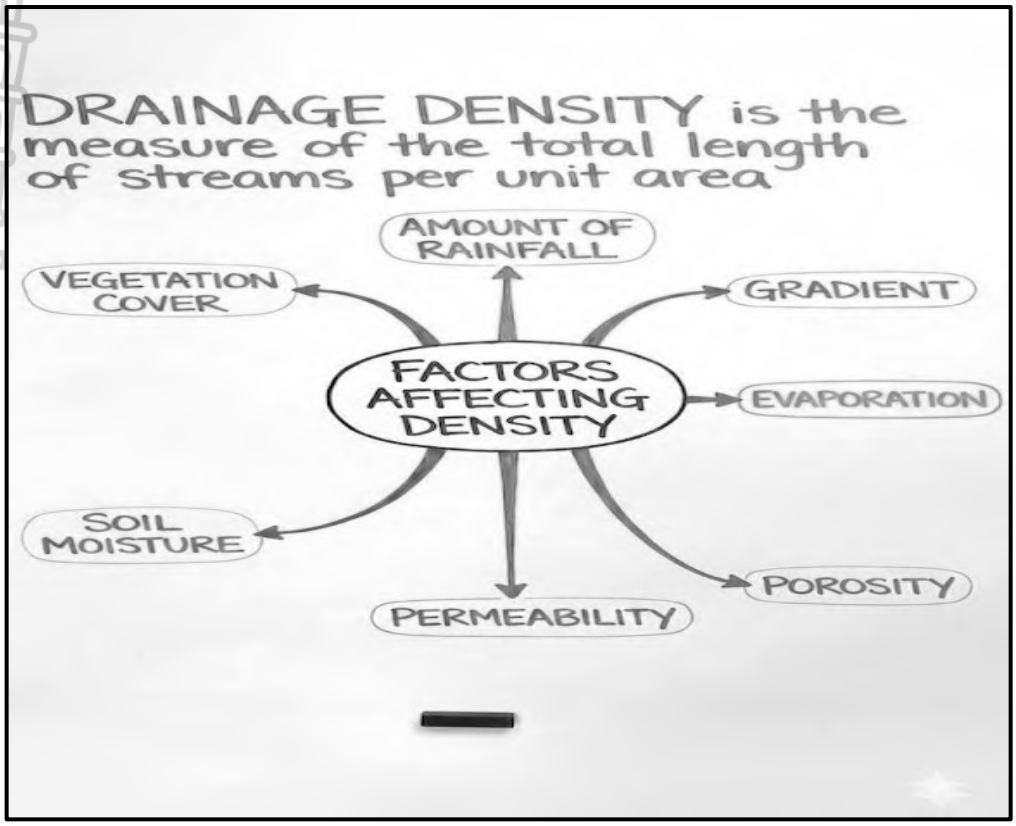
[Source: Gemini image]

2.2.1	Explain a possible reason for drainage pattern **E** to have many lakes.	(1 x 2)	(2)
2.2.2	Explain the characteristics of drainage pattern **A**.	(2 x 2)	(4)
2.2.3	Differentiate between the underlying rock strata associated with drainage patterns **A** and **D**.	(2 x 2)	(4)
2.2.4	Explain the similarities and differences between drainage patterns **A** and **C.**	(2 x 2)	(4)
2.2.5	Explain why tributaries at drainage pattern **B** join the main river at right angles.	(2 x 2)	(4)

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Factors influencing drainage density



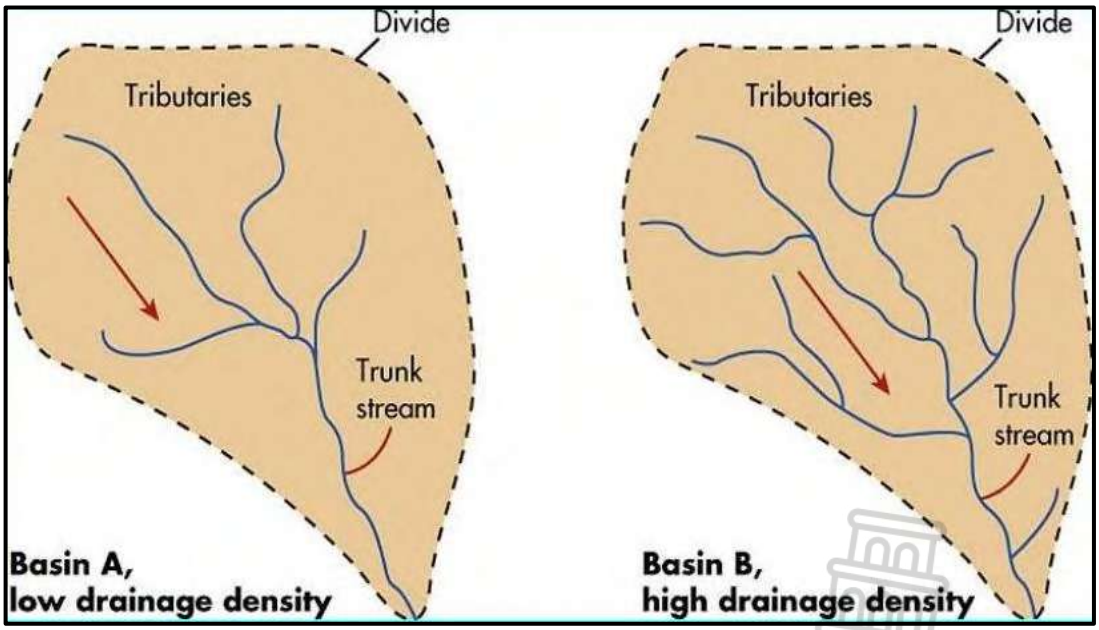
[Source: Gemini]

Amount of rainfall	• Heavy rainfall results to high surface runoff and less infiltration– leading to a high drainage density. • Soft rainfall results to low surface runoff and more infiltration–leading to low drainage density.
Gradient	• The steeper the gradient, the higher the surface runoff, less infiltration–leading to a high drainage density. • The gentler the gradient, the lower the surface runoff, more infiltration–leading to a low drainage density.
Permeability	• Permeable rocks allow more infiltration and less surface runoff–leading to a low drainage density. • Impermeable rocks promote more surface runoff, less infiltration–leading to a high drainage density.
Porosity	• Porous rocks allow more infiltration, less surface runoff–leading to a low drainage density.

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	• Nonporous rocks allow more surface runoff, less infiltration–leading to a high drainage density.
Soil moisture	• Dry soils (unsaturated) allow more infiltration, less surface runoff–leading to a low drainage density. • Wet soils (saturated) result to less infiltration, more surface runoff –leading to a high drainage density.
Vegetation	• More vegetation (dense) allows more infiltration, less surface runoff–leading to a low drainage density. • Less vegetation (sparse) allows more surface runoff, less infiltration–leading to a high drainage density.

2.3	Refer to the diagram on drainage density.		
	 [Source: https://image2.slideserve.com/4624502/drainage-density-l.jpg]		
2.3.1	Define the concept *drainage density.*	(1 x 2)	(2)
2.3.2	Account for the low drainage density at **A.**	(1 x 2)	(2)
2.3.3	Explain the relationship between rainfall and drainage density.	(1 x 2)	(2)
2.3.4	Explain how vegetation and permeability have contributed to the low drainage density at **A**.	(2 x 2)	(4)
2.3.5	Explain how gradient and porosity have contributed to the high drainage density at **B**.	(2 x 2)	(4)

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Stream ordering

Stream ordering refers to the method of classifying streams in a drainage basin.

- The smallest streams (fingertip tributaries) are classified as first order streams.
- When similar stream orders join, the next high order stream is established e.g. 2nd order and 2nd order makes 3rd order.
- When a smaller stream order joins with a high order stream, the high order remains e.g. 1st order and 2nd order makes 2nd order.

Method of determining stream order:

1st order and 1st order = 2nd order

1st order and 2nd order = 2nd order

2nd order and 2nd order = 3rd order

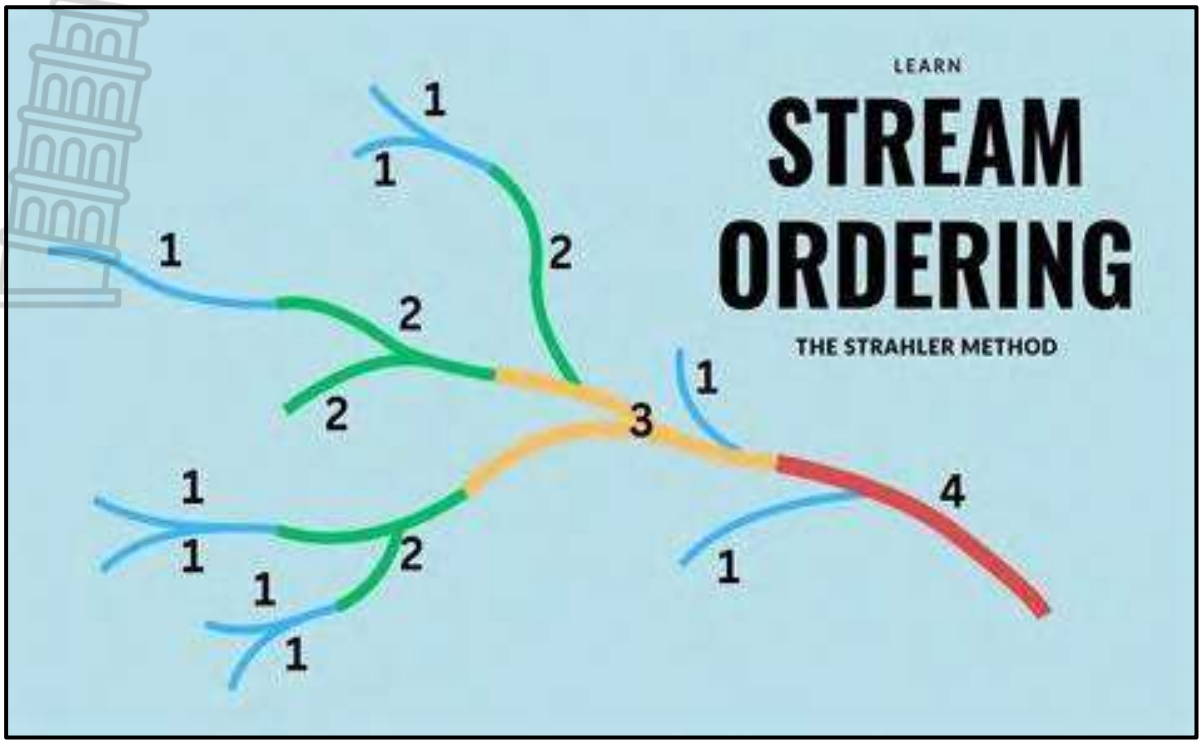
2nd order and 3rd order = 3rd order

3rd order and 3rd order = 4th order

3rd order and 4th order = 4th order

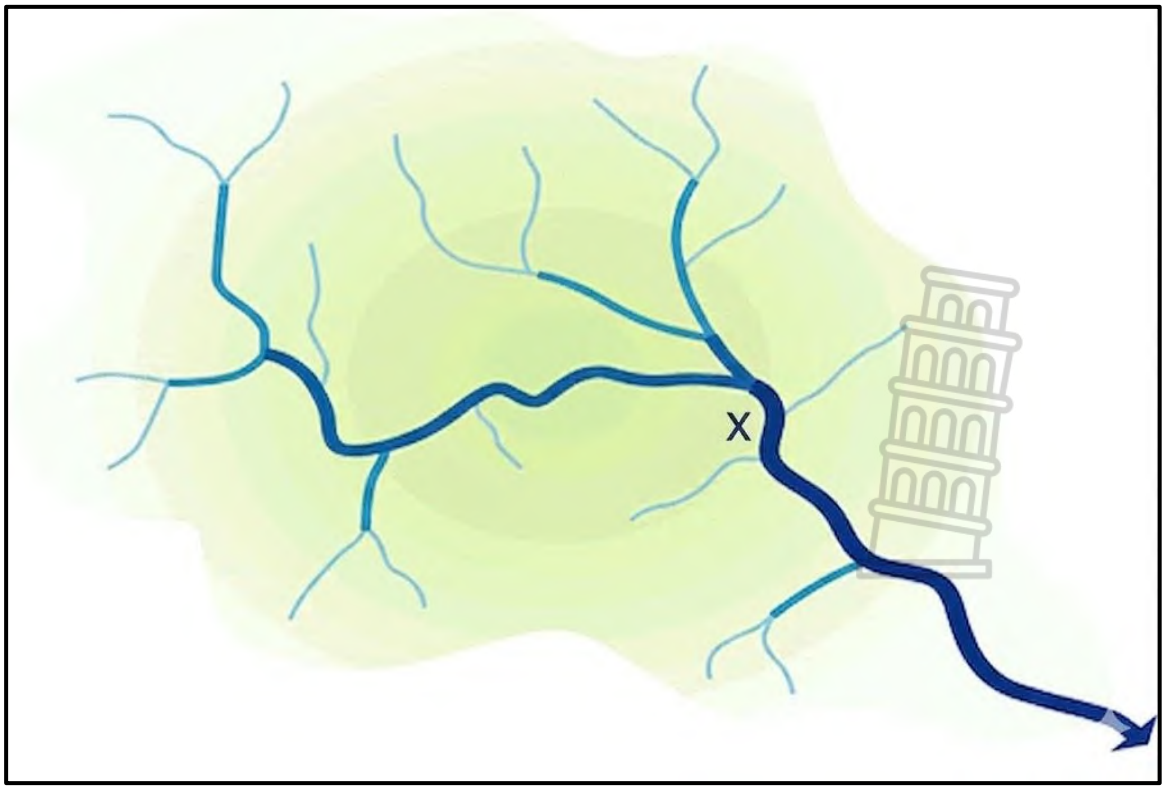
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[Source: https://earthhow.com/wp-content/uploads/2024/03/Stream-Ordering-Feature.jpg]

2.4	Refer to the diagram on stream ordering.



[Source: Gemini]

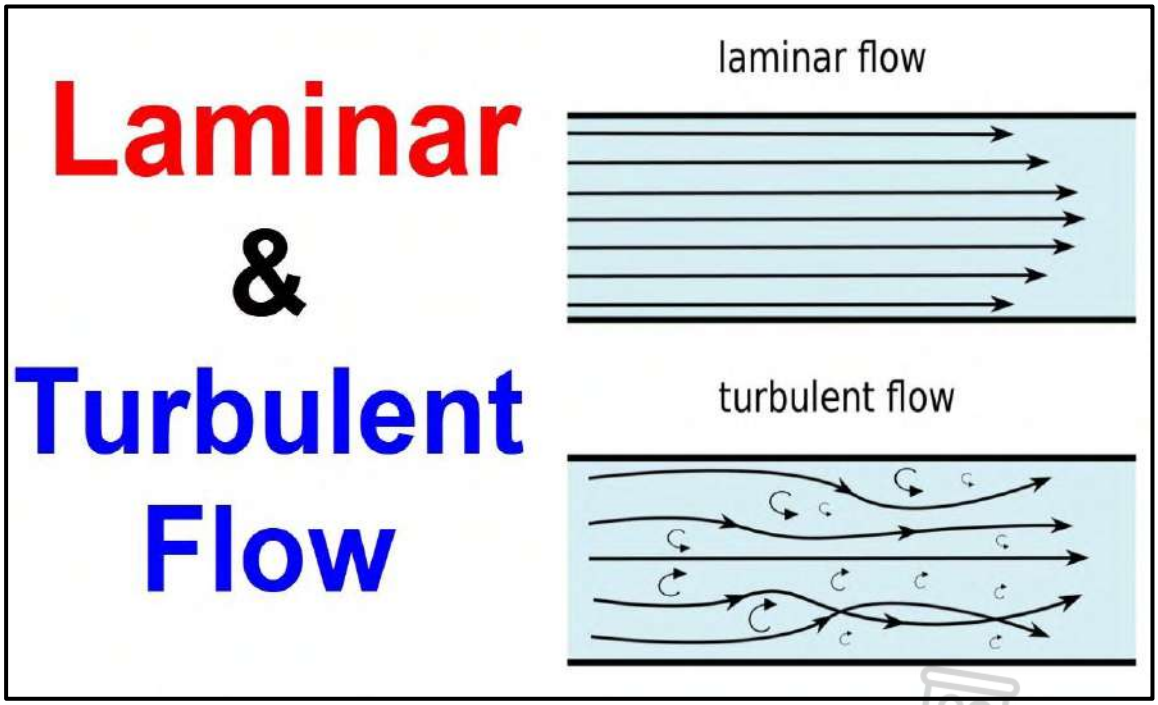
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2.4.1	Define the term *stream ordering.*	(1 x 2)	(2)
2.4.2	Determine the stream order at **X.**	(1 x 2)	(2)
2.4.3	Explain the relationship between stream order and drainage density.	(2 x 2)	(4)
2.4.4	How does the amount of rainfall impact on the stream order of a drainage basin.	(2 x 2)	(4)

River discharge

- It refers to the flow of water in a river.



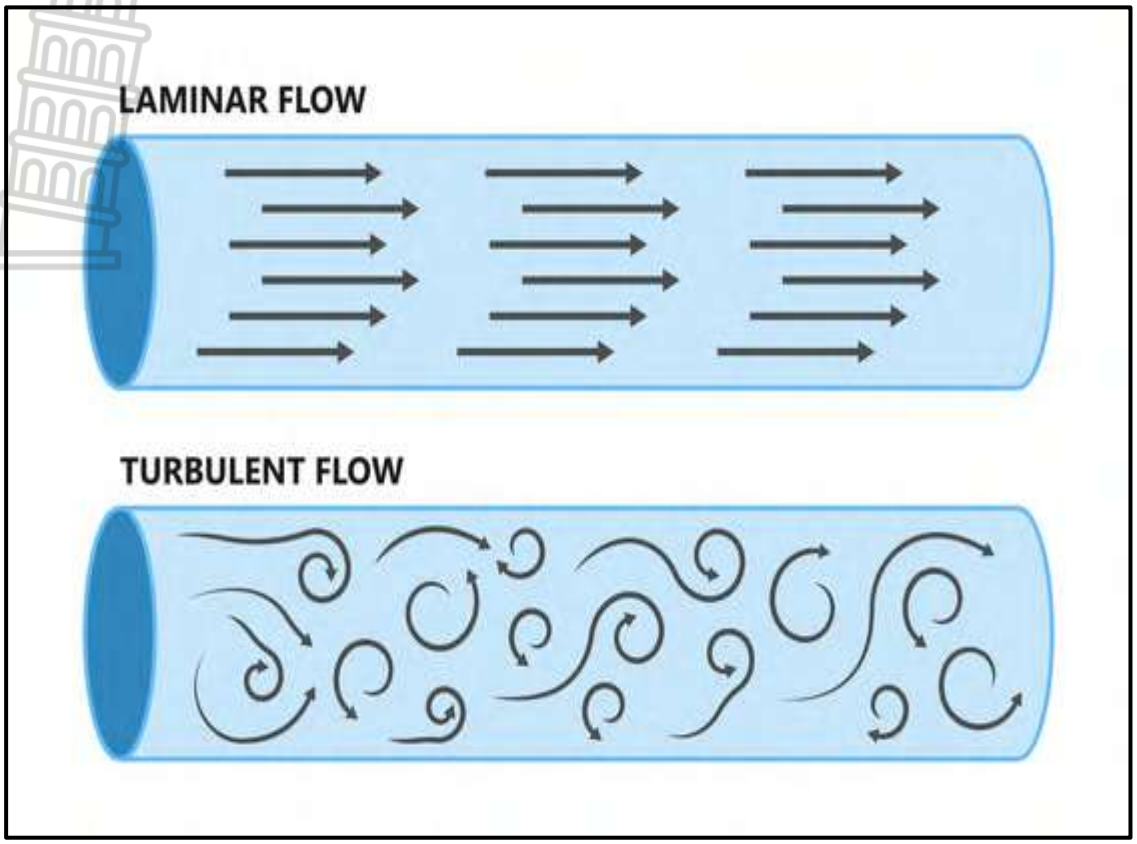
[Source: https://i.ytimg.com/vi/8dmRhI6WNQ8/maxresdefault.jpg]

Laminar flow	Turbulent flow
• Water flows smoothly in thin layers. • There are no rocks and boulders to cause friction between water and rocks. • Riverbed is even. • Associated with low rate of erosion.	• Water flows in complex and tumbling circular movement. • Riverbed is rough and uneven. • More energy is required to overcome obstacles. • Associated with high rate of erosion.

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2.5	Refer to the diagram on river discharge.



[Source: https://toptec.pk/wp-content/uploads/2024/06/Laminar-VS-Turbulent-Flow-1.png]

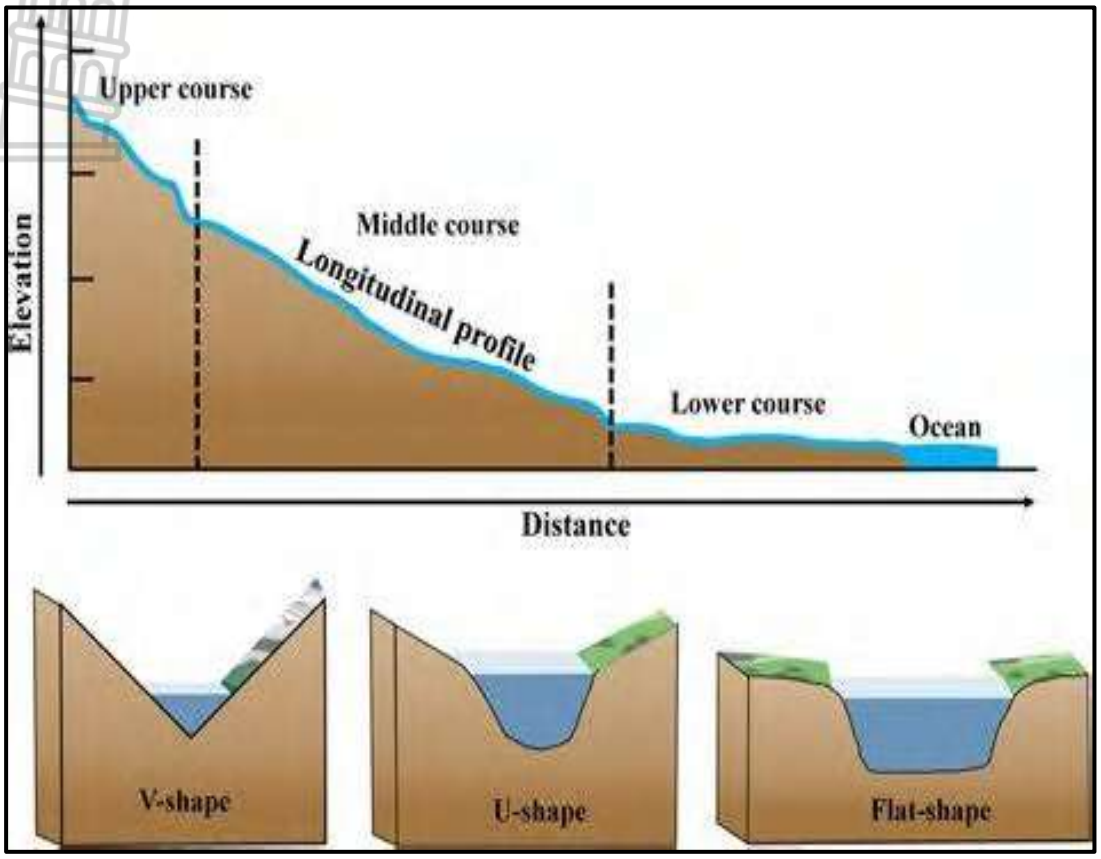
2.5.1	Define the concept *river discharge.*	(1 x 2)	(2)
2.5.2	Distinguish between laminar flow and turbulent flow.	(2 x 2)	(4)
2.5.3	Compare the riverbed of laminar flow with that of turbulent flow.	(2 x 2)	(4)
2.5.4	Compare rate of erosion for laminar flow and turbulent flow.	(2 x 2)	(4)

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River profiles

- There are two types of river profiles namely: longitudinal and cross profile.



[Source: https://distinctionpass.com/wp-content/uploads/2024/03/River-Profiles.png]

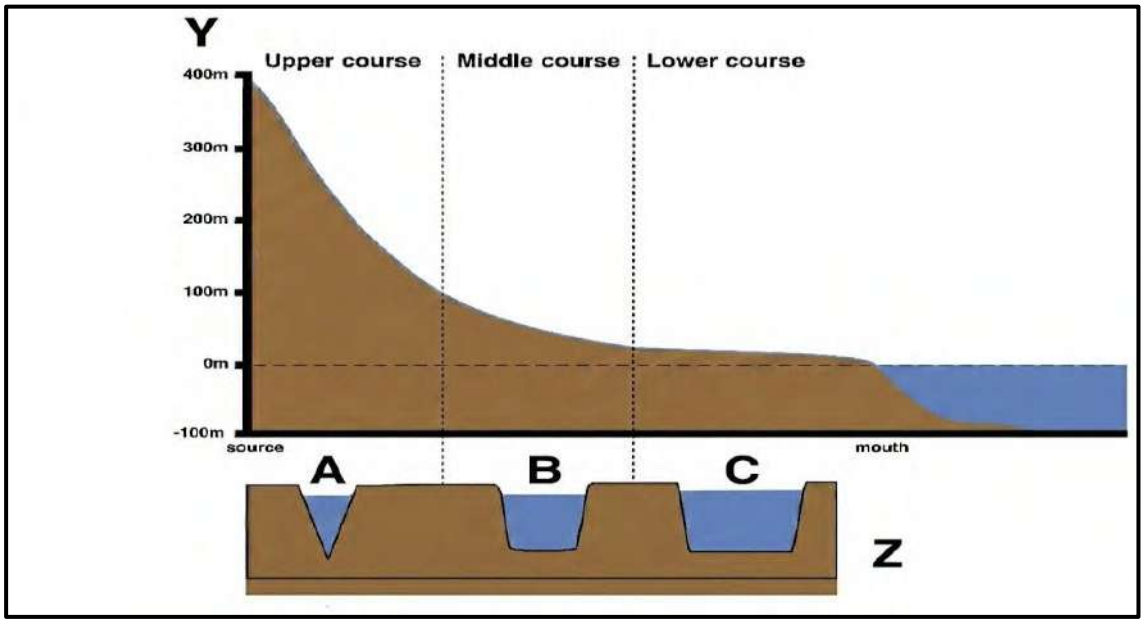
Longitudinal profile	Cross profile
It is a side view of a river from source to mouth. It shows the length and gradient of river	It is a view of the river from bank to bank. It shows the depth and width of river.
Upper course has a steep slope	Upper course is V shape
Middle course has gradual slope	Middle course is open V/ U shape
Lower course has a gentle slope	Lower course is wide U shape

Characteristics and landforms		
Upper course	**Middle course**	**Lower course**
Vertical erosion is dominant. Low volume of water.	Lateral erosion begins Volume and load increases	Laminar flow Greater volume of water

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Flow is turbulent. Dominant landforms are waterfalls and rapids.	Turbulent flow is becoming laminar. Small flood plains. River begins to meander.	Lateral erosion and deposition dominate. Some features include meanders, oxbow lake, large flood plains, braided streams and levees.

2.6	Study the diagram below on river profiles.		
	 [Source: https://distinctionpass.com/wp-content/uploads/2024/03/River-Profiles.png]		
2.6.1	Differentiate between a cross profile and longitudinal profile.	(2 x 1)	(2)
2.6.2	Account for the V- shape profile (**A**) in the upper course.	(1 x 2)	(2)
2.6.3	Describe the dimensions shown by a longitudinal profile.	(2 x 1)	(2)
2.6.4	Explain why the volume of water increases in the lower course.	(1 x 2)	(2)
2.6.5	Explain why the velocity on the river decreases in the lower course.	(1 x 2)	(2)
2.6.6	Explain the economic and environmental benefits of constructing a dam at the upper course of a river.	(2 x 2)	(4)

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Identification and description of fluvial landforms and features

Fluvial landforms are those landforms generated by running water, mainly rivers. Some features are because of river erosion and deposition.

Meander



[Source: Gemini]

- A meander is defined as a distinct curve or loop in the course of a river channel.
- In the middle course the river has more energy and a high volume of water because of tributaries joining or merging.
- Lateral (sideways) erosion starts to widen the river channel.
- As the river erodes laterally (bank to bank) it forms large bends and then horseshoe-like loops called meanders.

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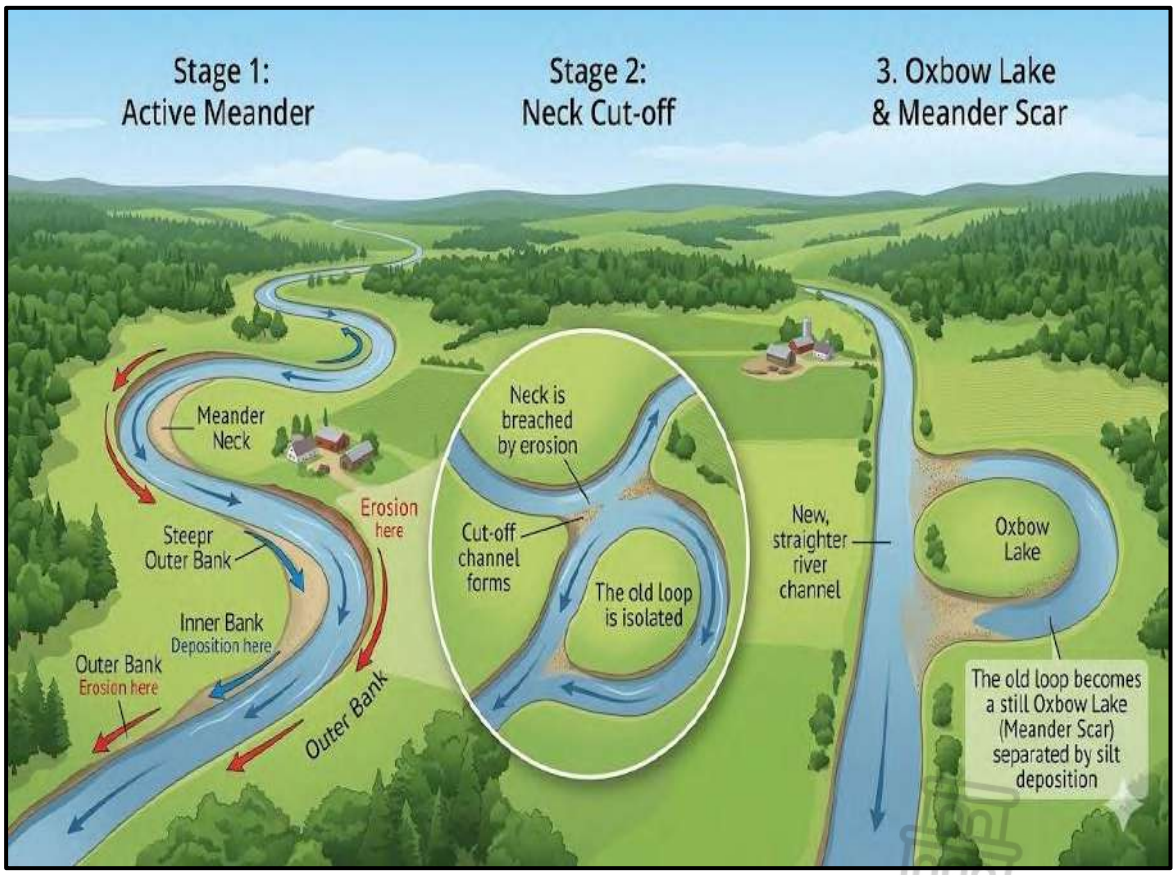
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Oxbow lake

- The cut-off meander loop filled with water is called oxbow lake.

Formation

- Continuous undercutting at the outer bank and deposition at inner bank causes the horseshoe to become tighter over time, until the ends become very close together.

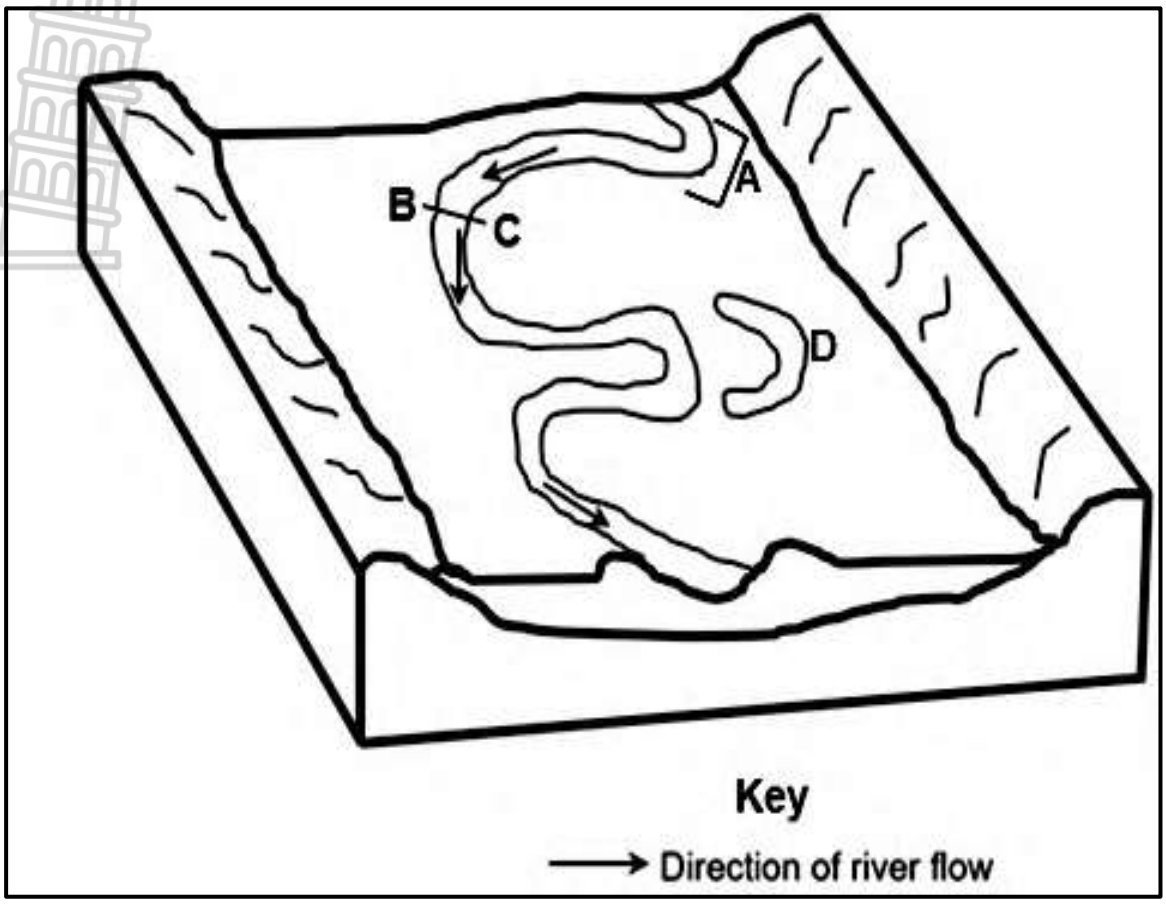


[Source: Gemini]

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2.7	Refer to the diagram below on fluvial features and landforms.



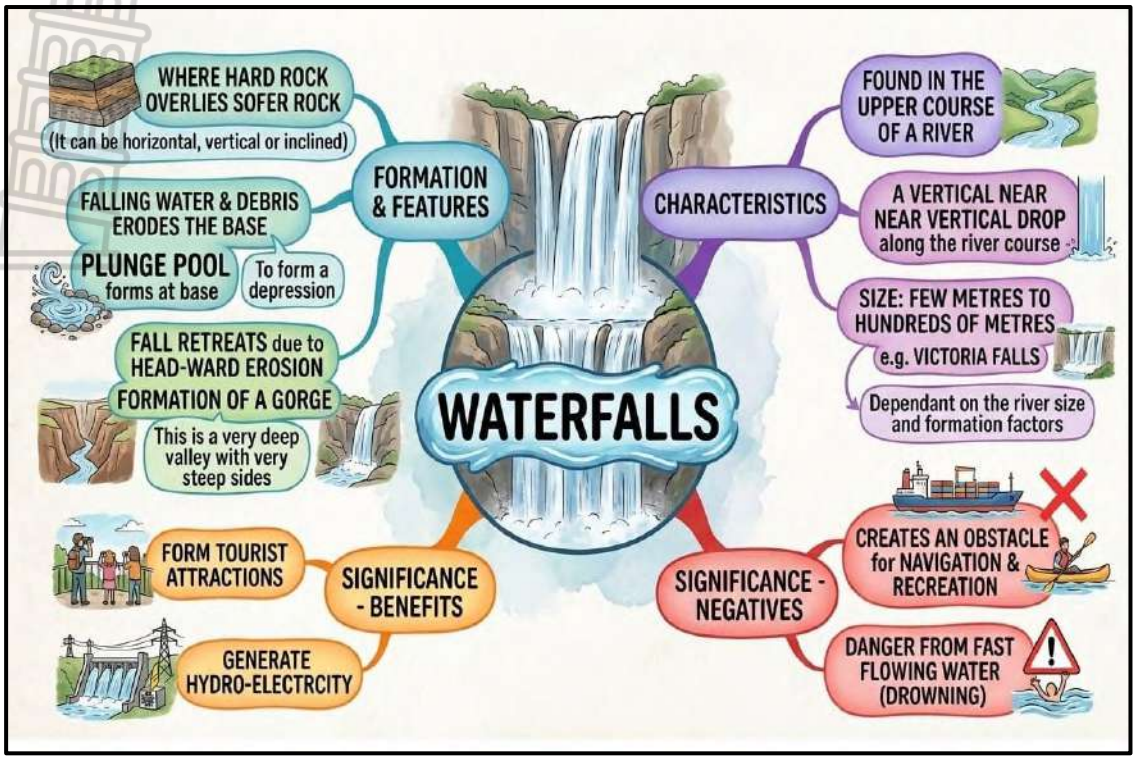
[Source: Examiner's own sketch]

2.7.1	Draw a cross-section of the meander at **B-C**. Clearly show the undercut slope and slip-off-slope.	(2 x 1)	(2)
2.7.2	Explain the difference between the slope at **B** and **C.**	(2 x 2)	(4)
2.7.3	Explain how feature **D** is formed.	(3 x 2)	(6)
2.7.4	Explain the socio-economic importance of the flood plain.	(3 x 2)	(6)

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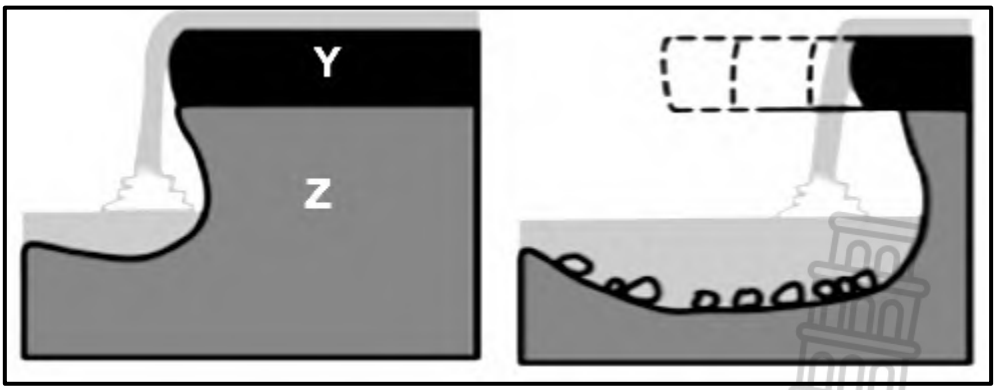
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Waterfalls



[Source: Gemini]

2.8	Refer to the diagram on a waterfall.		



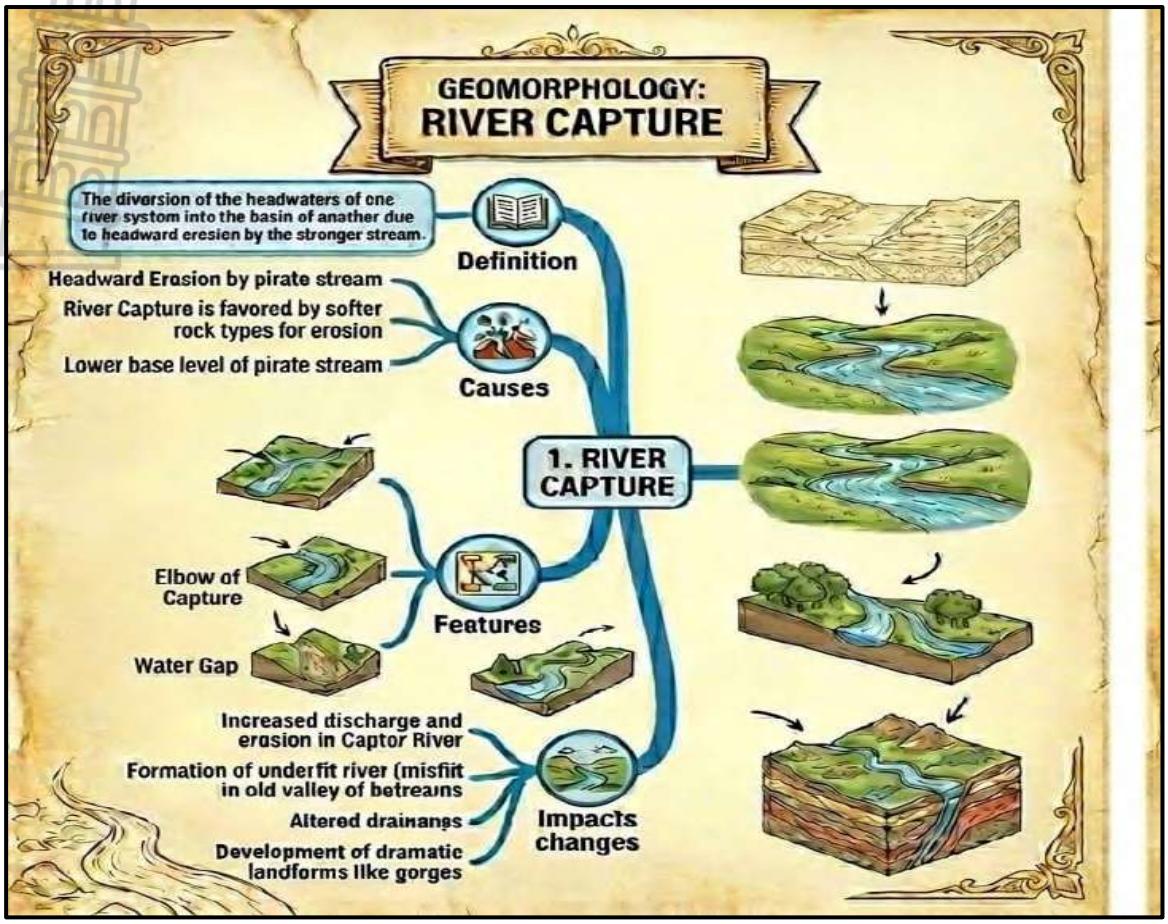
[Source: Examiner's own sketch]

2.8.1	Define the concept *waterfall.*	(1 x 2)	(2)
2.8.2	Explain the negative impacts of a waterfall.	(1 x 2)	(2)
2.8.3	Explain the significance of a waterfall.	(2 x 2)	(4)
2.8.4	Explain what happens to rock **Y** and **Z** when a waterfall retreats.	(3 x 2)	(6)

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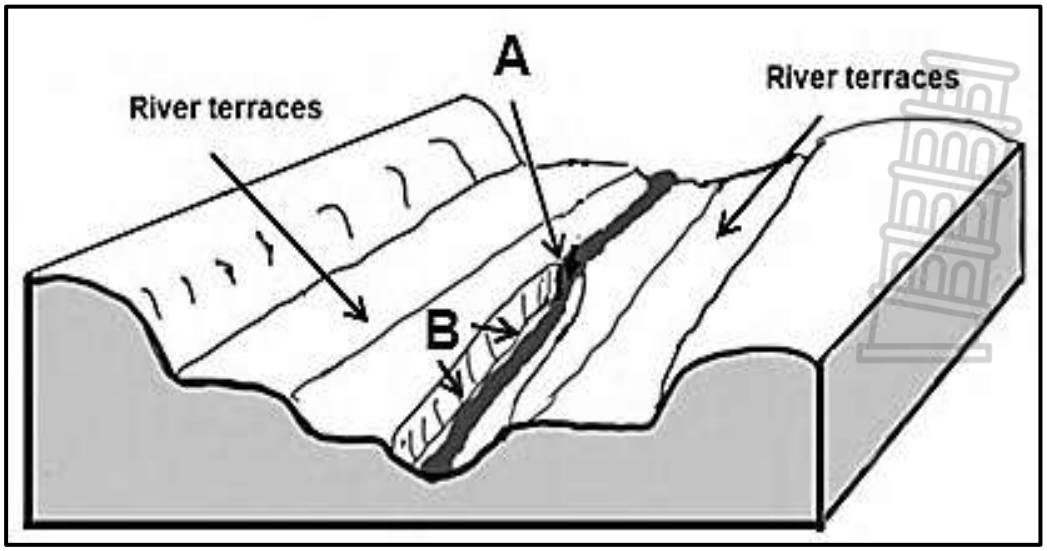
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River capture



[Source: Gemini]

2.9	Refer to the sketch on river rejuvenation.



Source: Gemini

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2.9.1	Define the concept *river rejuvenation*	(1 x 2)	(2)
2.9.2	Explain changes that occur on a flood plain and meanders as a result of river rejuvenation.	(2 x 2)	(4)
2.9.3	Explain the significance of a rejuvenated landscape.	(2 x 2)	(4)
2.9.4	Discuss the disadvantages of a rejuvenated river.	(2 x 2)	(4)

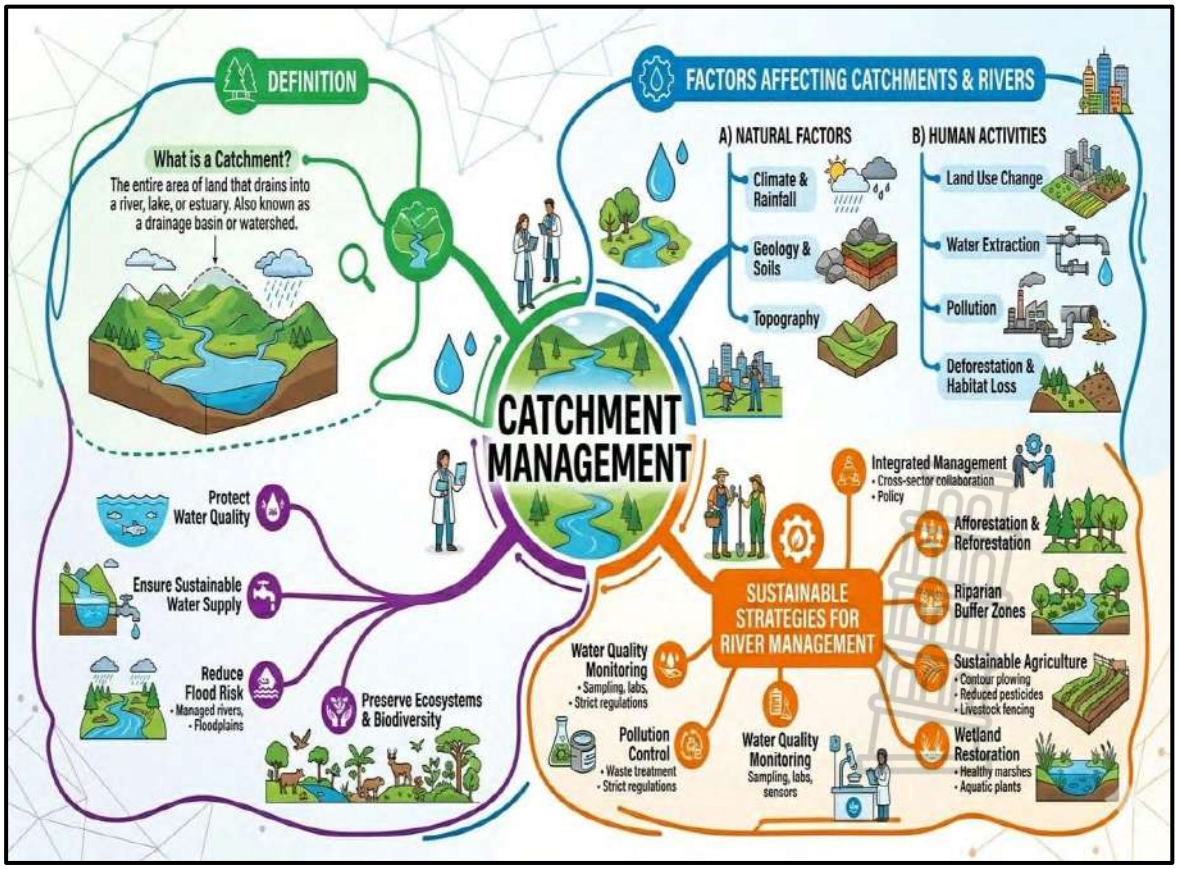
Catchment and river management

Catchment: The upper reaches of a drainage basin where the river obtains its water.

River Management: Wise use of water resources in a sustainable way so that they are available to the future generation.

Riparian*: Moist areas along the river course.

Alien plants*: Plant species that are foreign who are water thirsty.

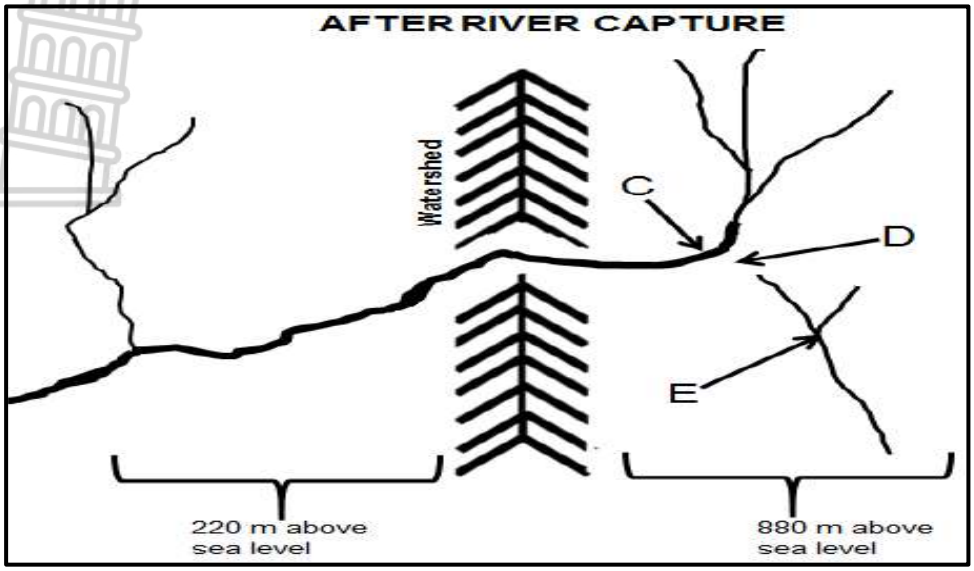


[Source: Gemini]

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2.10	Refer to the sketch on river capture.		



[Source: Own sketch]

2.10.1	Explain the concept *river capture*	(1 x 2)	(2)
2.10.2	Re-draw the diagram in 2.10 before river capture took place	(2 x 1)	(2)
2.10.3	Explain changes that will occur on captor stream after river capture	(2 x 2)	(4)
2.10.4	In a paragraph of approximately EIGHT lines Explain the negative environmental and economic impact of river capture along river E	(4 x 2)	(8)

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2.11 Refer to the article on river management.

RIVER TURNS BLACK AFTER COAL MINE DAM COLLAPSES NEXT TO RURAL COMMUNITIES AND HLUHLUWE-IMFOLOZI GAME RESERVE

By Tony Carie, 11 January 2022

Large volumes of potentially toxic coal mine effluent (waste) have spilled into rivers flowing through rural communities and the Hluhluwe-Imfolozi Game Reserve.
According to the US-based Union of Concerned Scientists, mining and coal-washing operations produce high water pollution which can also contain toxic heavy metals such as arsenic copper, lead and manganese.

When the slurry dam* wall collapsed on 24 December, the residents of the affected communities were not warned about the potential hazards until two weeks later. Conservation managers in the neighboring Hluhluwe-Imfolozi Game Reserve were also led to believe that the spill was under control, only to discover pitch-black water flowing through the reserve several days later. By this stage, the black water had reached the confluence of the Black and White Imfolozi Rivers.

*Slurry dam – a dam that is used to store by-products of mining operations after separating the ore.

[Adapted from dailymaverick.co.za]

2.11.1	Define the concept *river management* .	(1 x 2)	(2)
2.11.2	Explain the factors affecting rivers in the Hluhluwe-Imfolozi.	(2 x 2)	(4)
2.11.3	Discuss the negative impacts of a polluted river on the ecosystem of the river.	(2 x 2)	(4)

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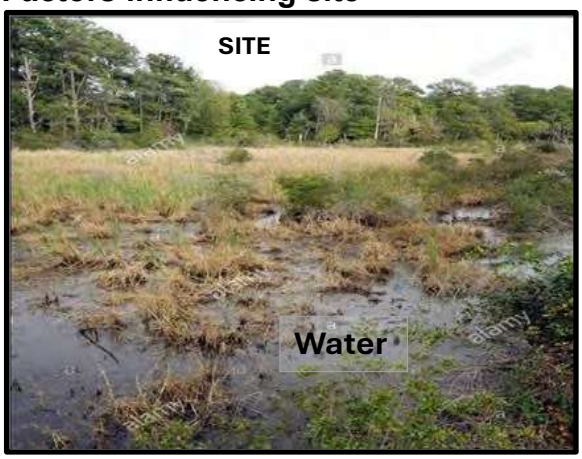
2.11.4	In a paragraph of approximately EIGHT lines explain sustainable strategies that can be implemented to protect rivers.	(4 x 2)	(8)

RURAL AND URBAN SETTLEMENTS

RURAL SETTLEMENT

KEY CONCEPTS	DEFINITION
Settlement	A place where people live which includes buildings, economic activities and transport networks that work as an integrated unit on a daily basis.
Site	An exact piece of land where a settlement is built.
Situation	The location of a settlement in relation to the surroundings.
Rural-urban migration	The movement of people from rural areas to urban areas.
Push factor	Factors that force people to leave rural areas.
Pull factor	Factors that attract (draw) people into urban areas.
Rural depopulation	The decline (decrease) in the number of people living in rural areas.
Social justice	Creating equal opportunities and meeting the basic needs of people.
Social injustice	Unequal/unfair opportunities created to meet the basic needs of people.
Land reform	Government policy aimed at bringing about equitable distribution and access to land to people.

Factors influencing site



[Adapted: https://encrypted-tbn0.gstatic]

Factors influencing situtation



[Adapted:https://www.shutterstock.com]

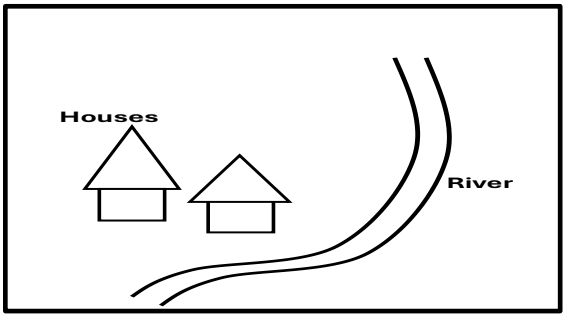
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Mostly physical: soil fertility; flat land; north-facing slopes; water supply e.g. rivers, spring etc.	**Mostly human factors (man-made)**: railways; harbours; airports; distance to markets; access to resources; roads.

Influence of site and situation

Wet point settlement



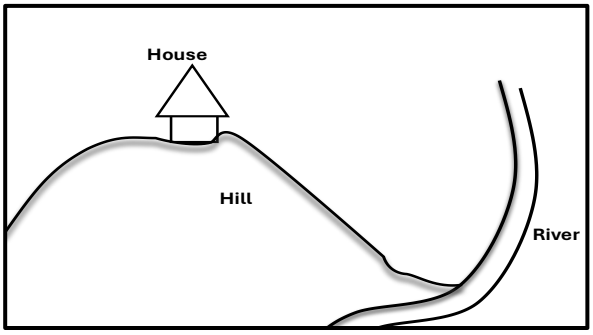
[Source:Own sketch]



[Adapted: https://encrypted-tbn0.gstatic]

- Settlements are located close to a water source e.g. river, well, oasis etc.
- Found in areas where there is shortage of water (scarce) e.g. arid areas.

Dry point settlement



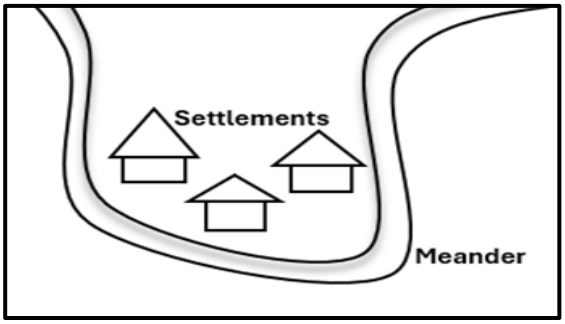
[Source:Own sketch]



[Adapted: https://travelground.imgix.net]

- Settlements are located away from a water source as water is a threat e.g floods.
- Located on higher grounds e.g. top of hills or mountains.

Defence settlement



[Source:Own sketch]



[Adapted: https://www.shutterstock.com]

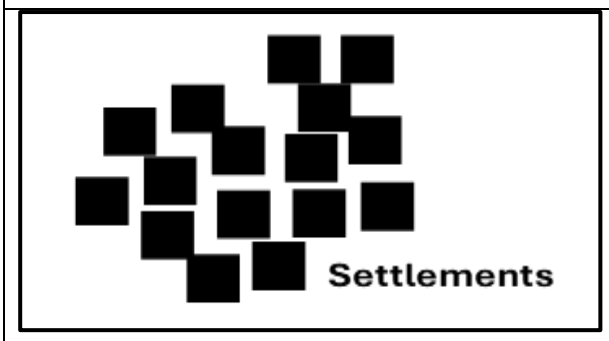
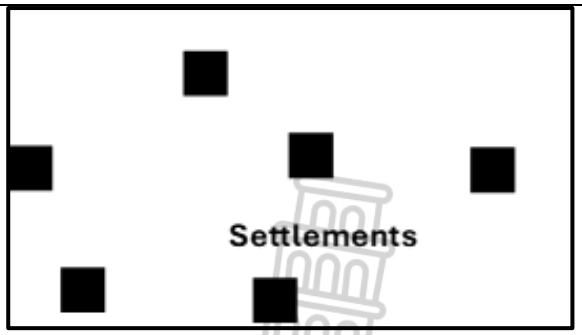
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- Settlements located in the loop of a meander loop or top of hills for safety reasons.
- Can also be at the foothills of mountains as it is hidden or sheltered.

Classification of rural settlements according to patterns

- Shows the spacing of settlements in relation to each other.
- There are two types of settlement patterns namely; nucleated and dipersed.

Nucleated settlement	Dispersed settlement
❖ Houses are close to each other (clustered)	❖ Houses are far apart from each other (scattered)
	
[source: https://licchavilyceum.com/types-and-patterns-of-rural-settlements/]	
	
[Source:Own sketch]	[Source:Own sketch]
Social advantages	**Socio-economic advantages**
○ Sharing farming tools & ideas ○ Safety of belongings ○ Strong social interaction ○ Easy access to basics services	○ More privacy and personal space ○ Independent farmers (own decisions) ○ Use of modern farming methods ○ Large profits
Socio-economic disadvantages	**Socio-economic disadvantages**
○ Lack of privacy ○ Conflicts may arise	○ Long distances to access basic services

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○ Limited space for expansion ○ Overcrowding and noise ○ Sharing of small profits	○ Social isolation (boredom) ○ Easy target for criminals

Identification and reasons of different rural settlement shapes

- The main reason for the development of most shapes of settlement is accessibility to transport (roads).

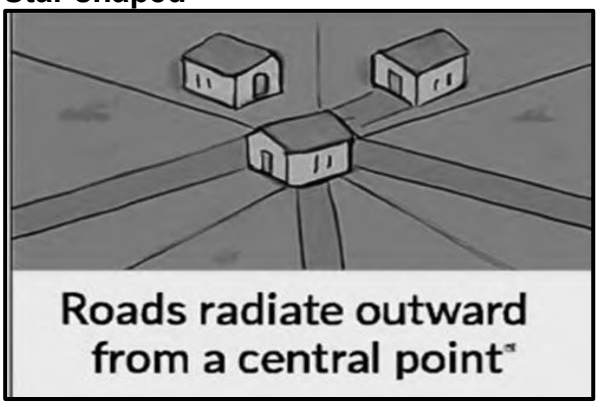
Linear shaped



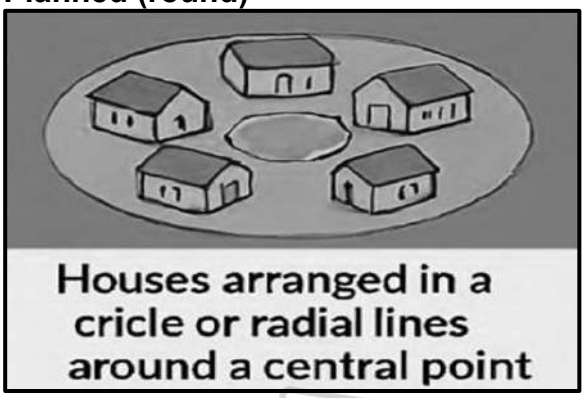
Cross shaped



Star shaped



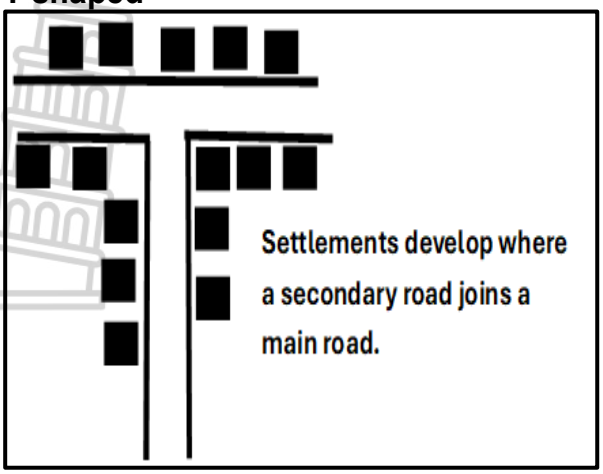
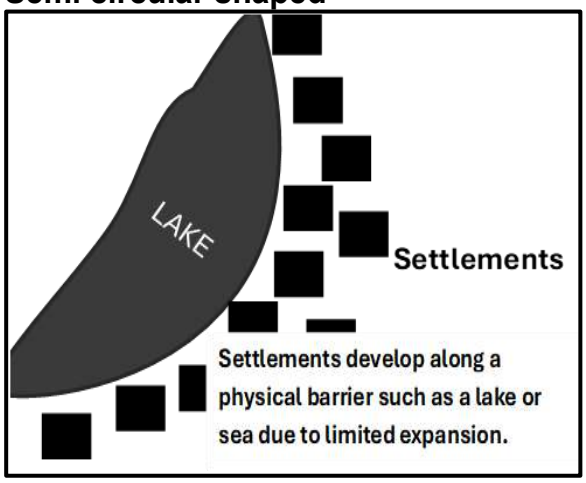
Planned (round)



[source: https://licchavilyceum.com/types-and-patterns-of-rural-settlements/]

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T-shaped	Semi circular shaped
	

[Source:Own sketches]

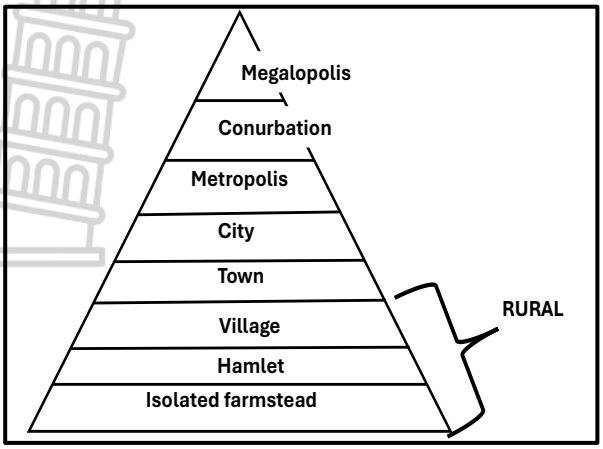
Classification of a settlement according to function

Rural settlement	Urban settlement
 [Adapted:https://encrypted-tbn0.gstatic.com]	 [source:https://businesstech.co.za/news/wp-content/uploads/2025/03/durban-cbd-e1743056771671.jpg]
○ Unifunctional (one dominant function). ○ Linked to primary economic activities ○ Examples; agriculture, forestry, mining etc. ○ Classified according to farmsteads, hamlets and villages. ○ Setllement pattern maybe nucleated or dispersed.	○ Multifunctional (many functions). ○ Linked to secondary, tertiary and quartenary economic activities. ○ Examples; factories/industries, schools, hospitals, hotels etc. ○ Classified according to towns, cities, metropolis, cornurabation and megalopolis. ○ Settlement pattern is always nucleated.

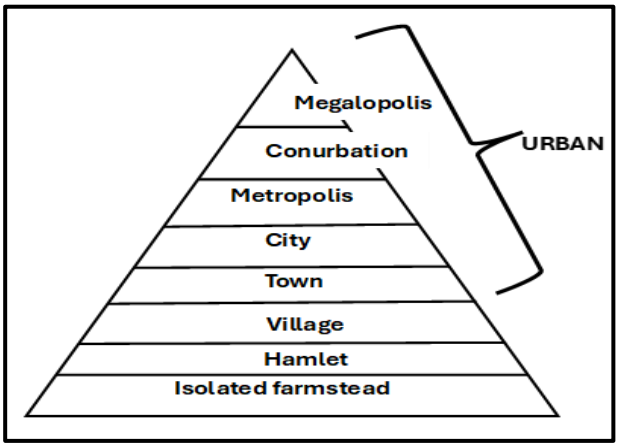
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Settlements classified according to hierarchy

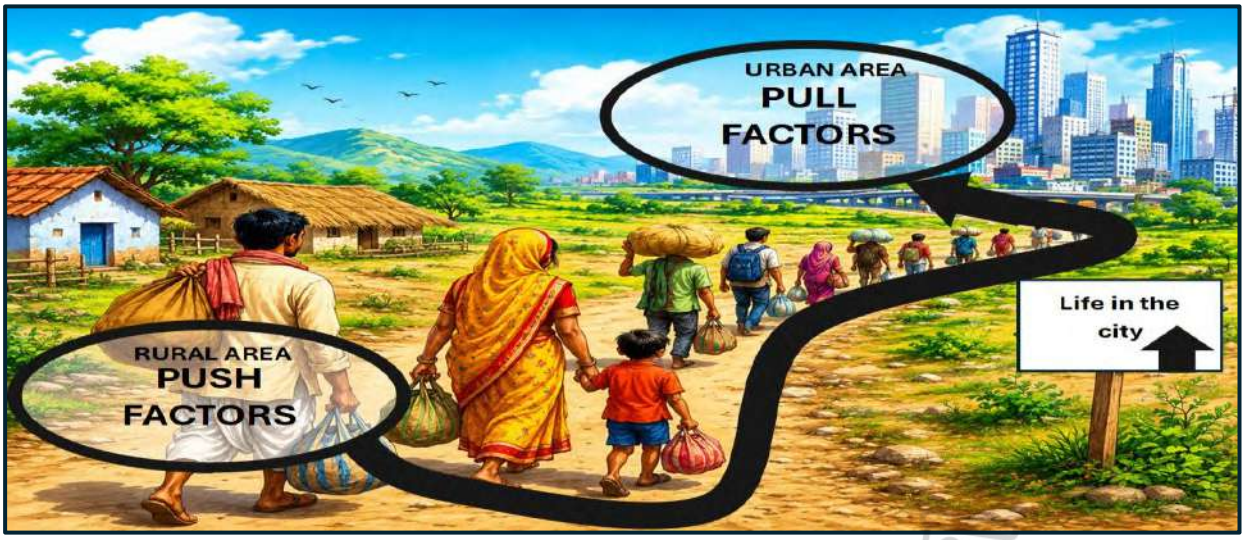


[Source:Own sketch]



[Source:Own sketch]

Rural settlement issues: *Rural urban migration*



[Adapted from ChatGPT]

PUSH FACTORS			PULL FACTORS	
Socio-economic	**Social**	**Environmental**	**Socio-economic**	**Social**
○ Lack of infrastructure ○ Crop & livestock diseases ○ Few jobs ○ Low salaries & wages	○ Poor quality housing ○ Poverty ○ Insufficient electricity ○ Poor health care services	○ Floods ○ Drought ○ Pests & diseases ○ Soil erosion	○ Improved infrastructure ○ Variety of jobs ○ Higher wages & salaries ○ Improved quality of life	○ Improved housing ○ Access to basic services ○ Improved living standard ○ Access to entertainment

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			○ Efficient transport system	○ Food security

How is reality different when people migrate into urban areas?

- ○ Migrants end up living with relatives or friends due to lack of money to rent.
- ○ A greater chance of some migrants living in informal settlements and streets.
- ○ Due to increased population of migrants, government struggles to meet demand for the provision of basic services.
- ○ People end up earning low salaries and wages thus struggling to pay rent.
- ○ When people flock into urban areas, there are actually no plenty of jobs
- ○ Most jobs require qualifications while some migrants are underqualified and less competitive in the job market.

NB: Learners should be able to provide a factor and a qualifier.

Consequences of rural-urban migration

ON RURAL AREAS	ON URBAN AREAS
○ Closure of shops and schools ○ Decrease in farm production ○ Under-utilisation of resources ○ Broken family units ○ Rise of ghost settlements ○ Brain drain	○ Influx of informal settlements ○ Increased crime ○ Increased demand for basic services ○ Rapid spread of diseases ○ Uncontrollable management of waste ○ Traffic congestion ○ Values and traditions break

Sustainable strategies to manage dwindling (declining) rural settlements

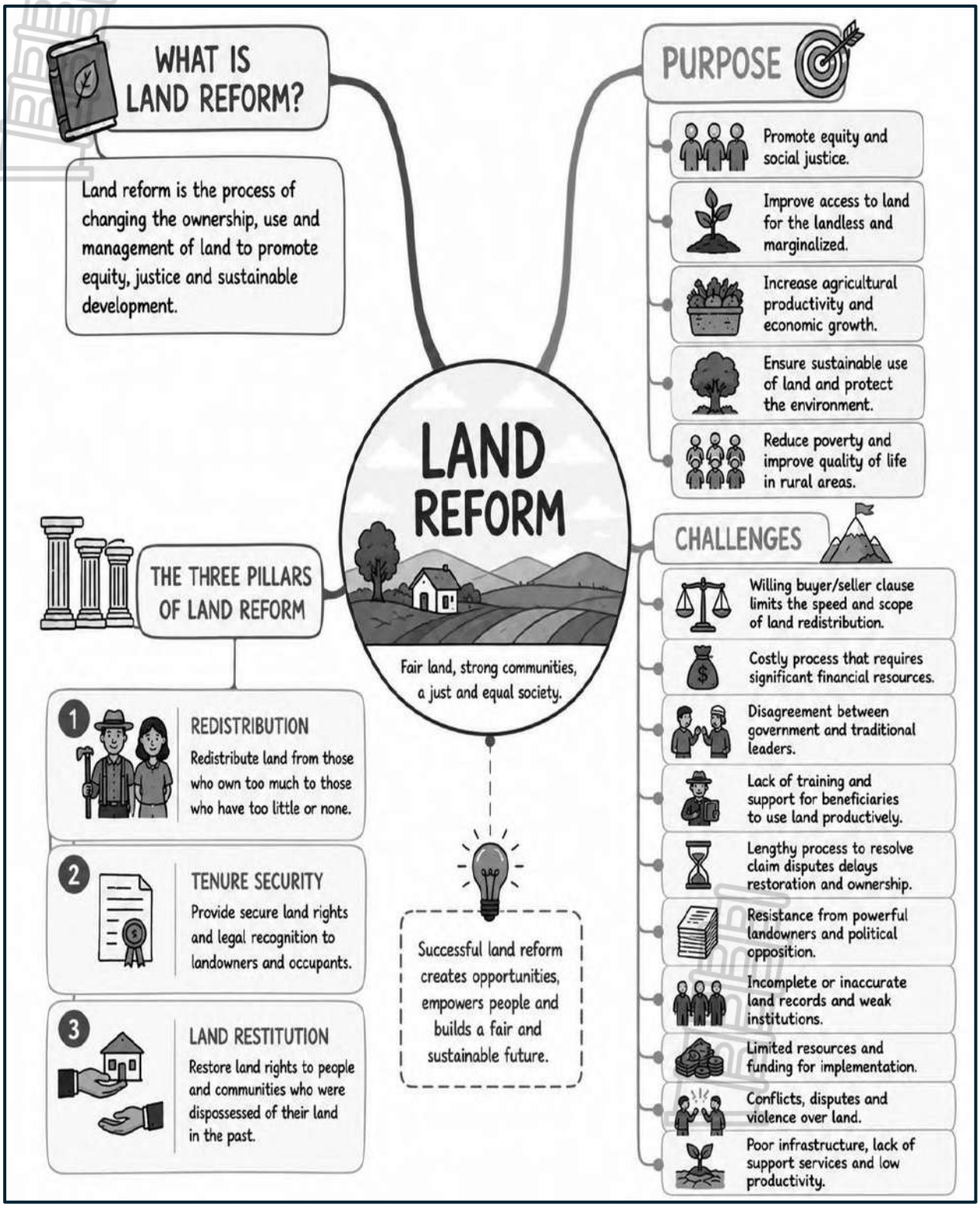
- ○ Provision of basic services e.g. water, electricity, health etc.
- ○ Upskilling people through training programmes.
- ○ Provision of proper housing.
- ○ Accelerating land reform policy to alleviate poverty.
- ○ Provision of capital or GM seeds to farmers.
- ○ Using drought resistant crops to increase food security.
- ○ Creating more jobs.
- ○ Using scientific methods of farming.

NB: Learners should be able to provide a factor and a qualifier.

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Rural settlement issues: Land Reform



[Source: ChatGPT]

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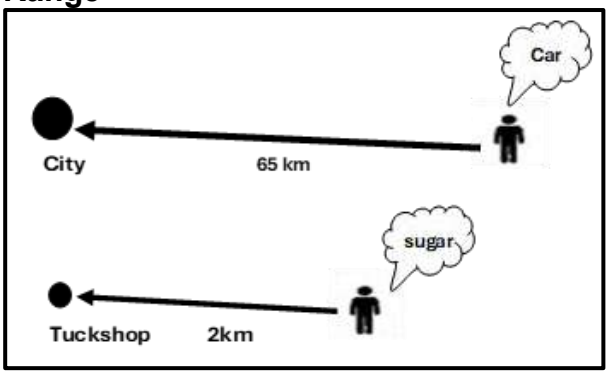
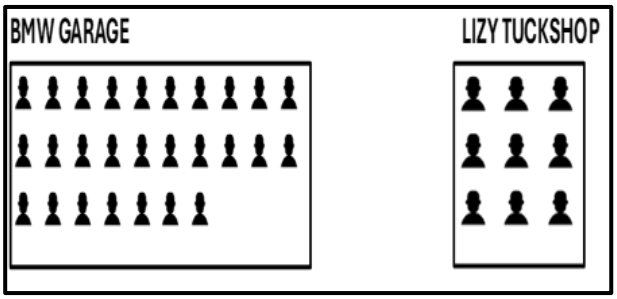
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URBAN SETTLEMENT

KEY CONCEPTS	DEFINITION
Urban hierarchy	Arrangement of settlements in an area from the smallest to the largest.
Urbanisation	Process by which an increasing percentage of people lives in urban areas.
Urban growth	Increase in the absolute number of people in urban areas.
Urban expansion	Physical growth of an urban area.
Urban sprawl	Formless (uncontrolled) expansion of urban areas.
Rate of urbanisation	Percentage by which an urban population is increasing.
Level of urbanisation	Percentage of people that live in urban areas.
Counter-urbanisation	Movement of people from urban areas back to rural areas.
Morphology	External physical appearance of a settlement.

Urban hierarchy

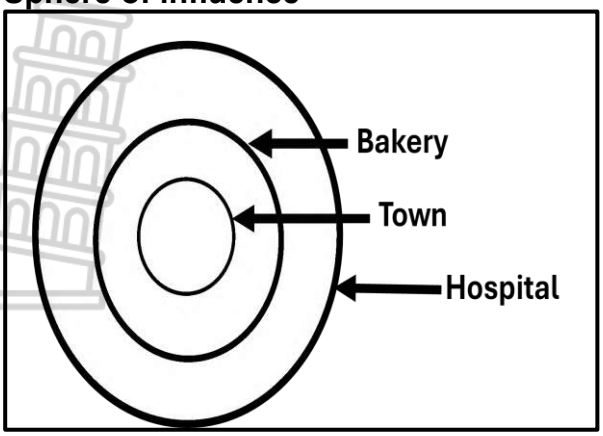
- Concepts (identification, description and interpretation)

Central place	Settlement that provides goods and services to the surrounding rural population.
Range  [Source:Own sketch]	***Range*** refers to the maximum distance that customers are prepared to travel to buy goods or services. ○ People travel longer distances to buy high order goods or services. example: car, judiciary etc. ○ People travel/walk shorter distances to buy low order goods or services. Example: sugar, electricity voucher etc.
Threshold population  [Source: Own sketch]	***Threshold population*** refers to the minimum number of customers needed to make a business profitable. ○ Businesses selling high order goods or services require a large population to be sustainable (profitable). ○ Businesses selling low order goods or services require a low threshold population to be sustainable.

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Sphere of influence



[Source:Own sketch]

Sphere of influence refers to the market or catchment area from where an urban settlement draws its customers.

- Sphere of influence of an urban area relies on its size and functions it offers.
- Larger settlements offer more specialised functions & greater number of functions than smaller settlements.
- Therefore, larger settlements have a larger sphere of influence than smaller settlements.

Low order goods/ low order services



[Source: https://hillcrestkwikspar.co.za]

Low order goods refer to goods that are required frequently (daily basis).

- Examples of low order goods include milk, bread, maize meal.
- Examples of low order services include electricity voucher, airtime etc.
- They are all offered by low order centres.
- Smaller range and small threshold population.
- They are called convenient goods (cheap)

High order goods/ high order services



[Source: https://encrypted-tbn0.gstatic.com/images]

High order goods refer to goods that are required infrequently.

- Examples of low order goods include cars, furniture etc.
- Examples of high order services include high courts, cardiologist etc.
- They are offered by high order centres.
- Greater range and large threshold population.

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Urban structure and patterns

The concepts of:

Urban profile

- It refers to the side view of an urban area (vertical dimension).
- The height of buildings increases as one move to the city centre and decreases outward.

Building density

- It refers to the number of buildings per unit area.
- It increases as one move towards the city centre and decreases outward.

Land value

- It refers to how much (monetary terms) a piece of land is worth.
- Land value is high in the city centres and decreases as one move outward.

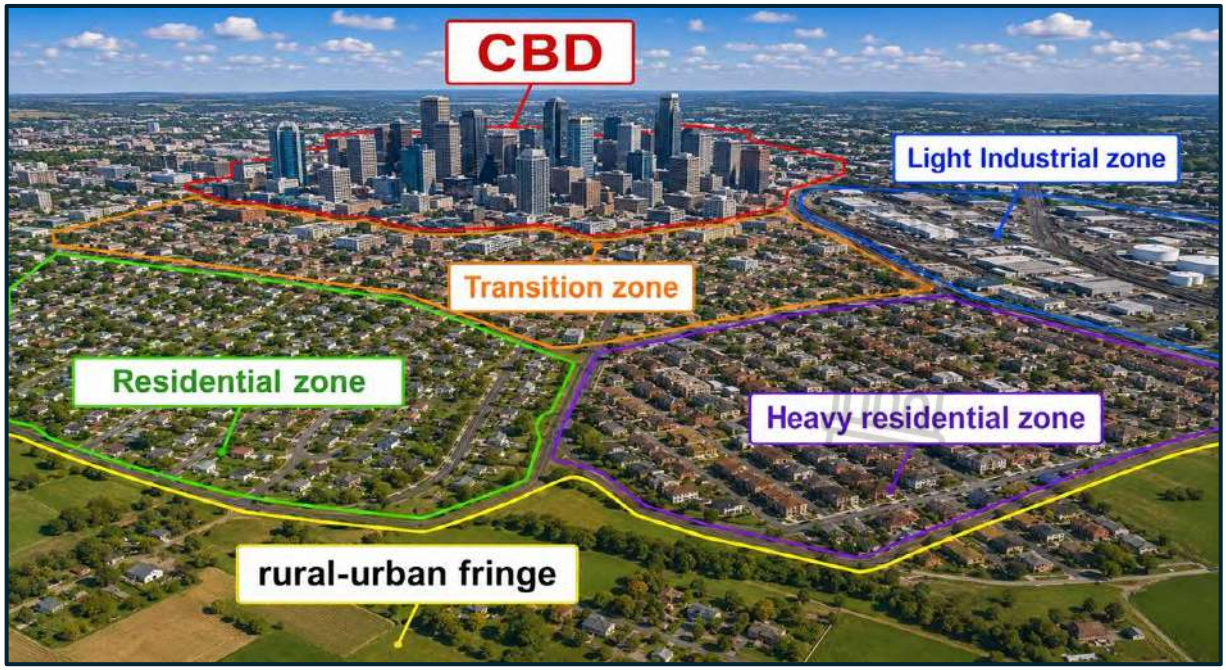
Land use

- It refers to the purpose to which land is used for.
- Examples include land used for farming, cemetery, greenbelts, golf course etc.

Land use zone

- Refers to an area in an urban settlement that has one dominant function.
- Examples include CBD, transition zone, residential zone, industrial zone, rural-urban fringe

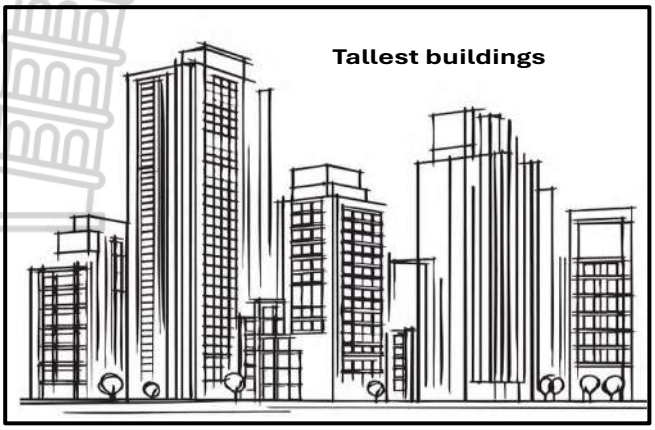
The land use zones in an urban area



[Source: ChatGPT]

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CENTRAL BUSINESS DISTRICT (CBD)  [Adapted: https://www.shutterstock.com/image-vector/high-rise-building]	○ Found at the centre of the urban area for accessibility. ○ It is the oldest land use zone since it is where development started. ○ It has tallest buildings (skyscrapers) for the purpose of maximising space. ○ There is high building density due to high competition for space. ○ Land values are high due to accessibility of important functions. ○ Mostly associated with grid-iron street pattern ○ The CBD is slowly becoming less prominent due to: crime, pollution, expensive rents, illegal immigrants, traffic congestion.
TRANSITION ZONE  [Source: Chat GPT)	○ Found at the edge of the CBD. ○ Associated with mixed functions e.g. residential, light industry etc. ○ Buildings are dilapidated (ageing) since landlords are not maintaining the buildings. ○ Associated with urban blight (graffiti, broken windows, old paint, protests etc.) ○ It is necessary to renovate buildings since land values are still high ○ It is a 'zone of change' as it is the future expansion of the CBD.
HIGH INCOME RESIDENTIAL ZONE  [Source: Adapted from ChatGPT]	○ Located away from the CBD and heavy industry (on the outskirt). ○ Associated with good views and sceneries e.g. at the coast. ○ There are large plots of land. ○ Houses are well maintained. ○ Variety of architectural design. ○ Highest land values ○ Large gardens ○ Recreational facilities: tennis courts, golf course, swimming pools etc.

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LOW INCOME RESIDENTIAL ZONE



[Source: https://cisp.cachefly.net/assets/]

- Example is RDP houses.
- Located near industrial areas, public transport and dumping sites.
- Small houses with limited space for recreational facilities.
- Same design and style.
- Houses are close to each other (high density housing)
- Houses can be old and neglected.

RURAL-URBAN FRINGE



[Source: Adapted from ChatGPT]

- Found on the outskirt of an urban area.
- Mixture of rural and urban functions.
- Examples of functions include cemeteries, airport, railway, golf courses, heavy industries, shopping malls, shooting range, purification plant etc.
- Also known as a 'zone of change' since urban functions invade the surrounding of this area.
- Some functions are preferred in this zone due to the land being flat, cheap and access to major routes.

Urban settlement issues: Traffic congestion

TRAFFIC CONGESTION



[Source: https://media.licdn.com/dms/image]

Refers to too many vehicles on the road such that traffic flow come to a virtual standstill.

- **Causes**: too many private cars, grid iron street pattern, narrow streets, daily commuting, influx of mini-bus, inefficient transport system, expensive parking fees.
- **Effects**: air pollution, urban heat island, late at work, stress, road rage, accidents, smash & grab et.
- **Solutions**: synchronize robots, public transports, park & ride facilities, cycle lanes, one-way street, strict monitoring of vehicles

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INFORMAL SETTLEMENTS  [Source: ChatGPT]	Refers to illegally built settlements made up of a variety of material such as plastics, cardboards etc. ○ **Location**: next to hazardous areas e.g. next to rivers (floods); heavy industries (pollution); dumping sites (poor hygiene) . ○ **Fire hazard**: variety of building material are flammable i.e. plastics, cardboards. ○ **Influx**-people are unemployed-not affording decent housing ○ **Lack basic services** (clean water, sanitation, legal electricity, proper housing, health care, proper roads) ○ **Inaccessible**: no street names-difficult for ambulances etc. ○ Associated with high population density, crime, drugs, poverty ○ **Solutions**: upgrading to formal housing, provide basic services, provide building material, provide jobs, relocation to proper areas.

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ACTIVITIES: RURAL SETTLEMENT

3.1 Refer to the infographic on rural-urban migration.

Rural -Urban migration a rescue to rural dwellers?

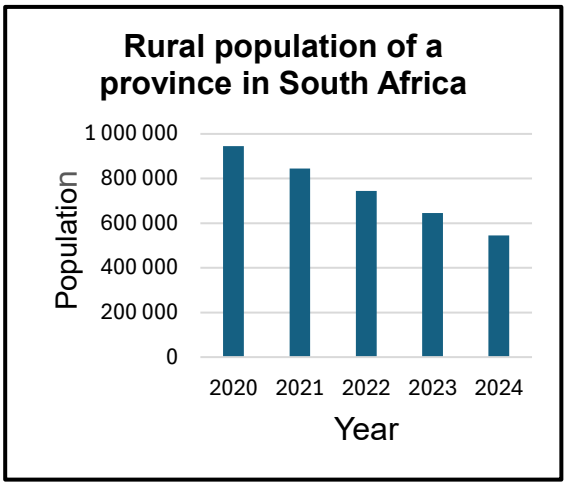
It is well accepted that rural-urban migration has formed part of South African household survival strategies. While it is acknowledged that economic factors such as employment and infrastructure fuel rural-urban migration, environmental hazards have also added to process – leaving areas such as Durban susceptible to floods.

[Source: https://www.sajems.org]

FACT FILE

Rural population	Population group	Percentage Leaving rural areas
	Adults (40+ years)	9%
	Youth (15-35 years)	?
	Children (0-14 years)	29%

[Source: Examiner's own construct]



[Source: Examiner's own construct]

	3.1.1	According to the fact file, determine the percentage of the youth leaving rural areas.	(1 x 2)	(2)
	3.1.2	Account for the huge proportion (answer to QUESTION 3.1.1) of the youth leaving rural areas.	(2 x 2)	(4)
	3.1.3	The graph shows a decreasing trend of the rural population from 2020 to 2024. Discuss TWO negative economic consequences that emerge as a result of this trend.	(2 x 2)	(4)
	3.1.4	Refer to the text. Explain how employment and infrastructure could strategically halt (reverse) the decreasing trend of the rural population.	(2 x 2)	(4)

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3.2 Refer to the article on land reform.

Implementation of land reform remains critical

The programme is built around three pillars — restitution, redistribution and land tenure reform — each intended to address different aspects of historical inequality.

Restitution focuses on restoring land or compensating communities dispossessed after 1913, while redistribution seeks to transfer land to black South Africans to address racial imbalances in ownership. Land tenure reform aims to secure land rights for people living in communal areas, farm dwellers and labour tenants.

Supporters of the programme highlight the slow pace of delivery and continue to point to perceptions of widespread "landlessness" among poor black communities, which fuel public frustration even to date. However, it remains unclear how *'land expropriation without compensation'* could facilitate the process of land reform without complications.

[Source: https://www.bizcommunity.com/article]

	3.2.1	Explain the phrase '*land expropriation without compensation*'.	(1 x 2)	(2)
	3.2.2	Besides addressing historical inequality, what purposes does the land reform programme serve?	(2 x 2)	(4)
	3.2.3	Explain how the land reform programme could uplift the standard of living in rural areas.	(2 x 2)	(4)
	3.2.4	In a paragraph of approximately EIGHT lines discuss the reasons that make the delivery of the land reform programme slow even to date.	(4 x 2)	(8)

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3.3 Refer to the article on social justice issues in rural areas.

uMsinga villagers Survive on One Cup of water a Day

In uMsinga, a rural area in northern KwaZulu-Natal, residents say they often survive on just one cup of water per person daily. Broken pipelines and prolonged drought have left taps dry for months, forcing villagers to rely on contaminated rivers and expensive water trucks. The crisis has hit women and children hardest, with many walking long distances to collect unsafe water, increasing risks of diseases and lost school time. Despite the Constitution guaranteeing access to sufficient water, communities say municipal repairs are delayed and promises of boreholes remain unfulfilled. Local leaders describe it as a *social injustice*, where rural households are left behind while urban areas receive consistent supply. Additionally, even though they argue that the land reform programme is slow, their hope is on the government trying to bring back land to the people which will help them indirectly access water and fight poverty.

[Source: https://www.groundup.news]

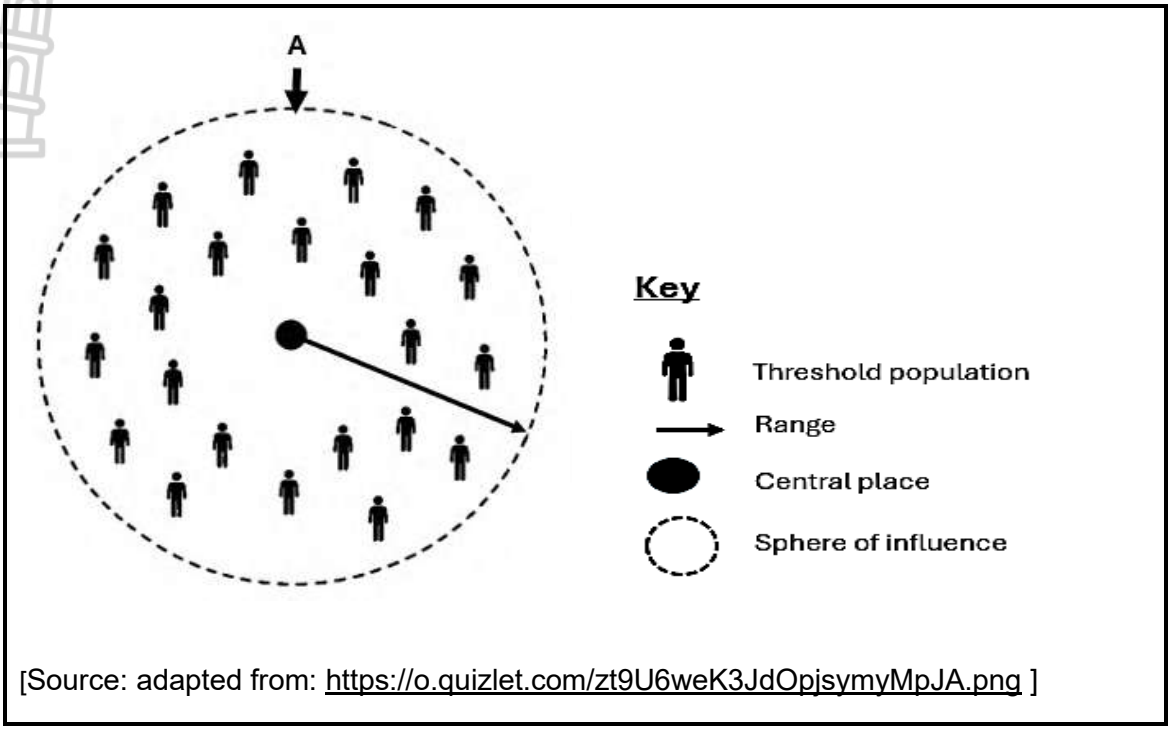
	3.3.1	Define the concept *social injustice*.	(1 x 2)	(2)
	3.3.2	Identify TWO social justice issues from the article.	(2 x 1)	(2)
	3.3.3	According to the article, how does water crisis impact negatively on women and children?	(2 x 1)	(2)
	3.3.4	Explain THREE long term strategies that the uMsinga local municipality should implement to deal with the water crisis.	(3 x 2)	(6)

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ACTIVITIES: URBAN SETTLEMENT

3.4 Refer to the sketch below.



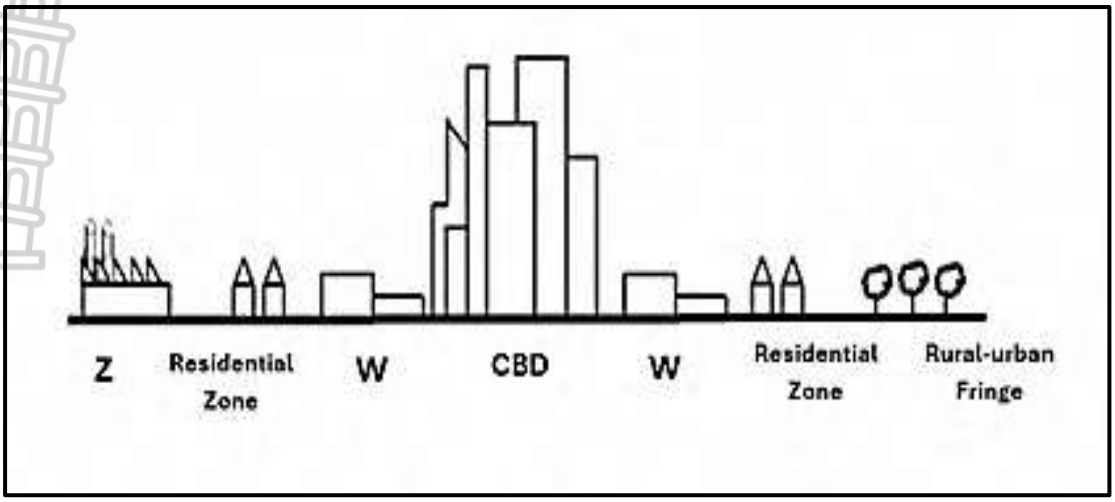
[Source: adapted from: https://o.quizlet.com/zt9U6weK3JdOpjsymyMpJA.png]

	3.4.1	Define the concept *central place.*	(1 x 2)	(2)
	3.4.2	Provide a label for **A**.	(1 x 1)	(1)
	3.4.3	Why are low order goods considered convenient for customers.	(1 x 2)	(2)
	3.4.4	Compare the threshold population of a spaza shop in a semi-urban area and a Volkswagen garage in a city.	(2 x 2)	(4)
	3.4.5	Explain why the range of a local salon will differ from that of a regional shopping centre.	(2 x 2)	(4)

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3.5 Refer to the sketch on land use zones.



[Source: adapted from https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcTlSCeM-0vlqNjolXr6_ypS4CzGYWOnSJSfvQ&s]

	3.5.1	Identify the land use zone **W** and **Z**.	(2 x 1)	(2)
	3.5.2	Land use zone **W** is referred to a 'zone of change'. Explain the statement.	(1 x 2)	(2)
	3.5.3	Explain why investors might be reluctant (hesitant) to do business at land use zone **W**.	(2 x 2)	(4)
	3.5.4	Why are the residential zone and land use zone **Z** actually incompatible.	(2 x 2)	(4)
	3.5.5	Suggest reasons for the relevance (suitability) of the rural-urban fringe tor commercial decentralization.	(3 x 2)	(6)

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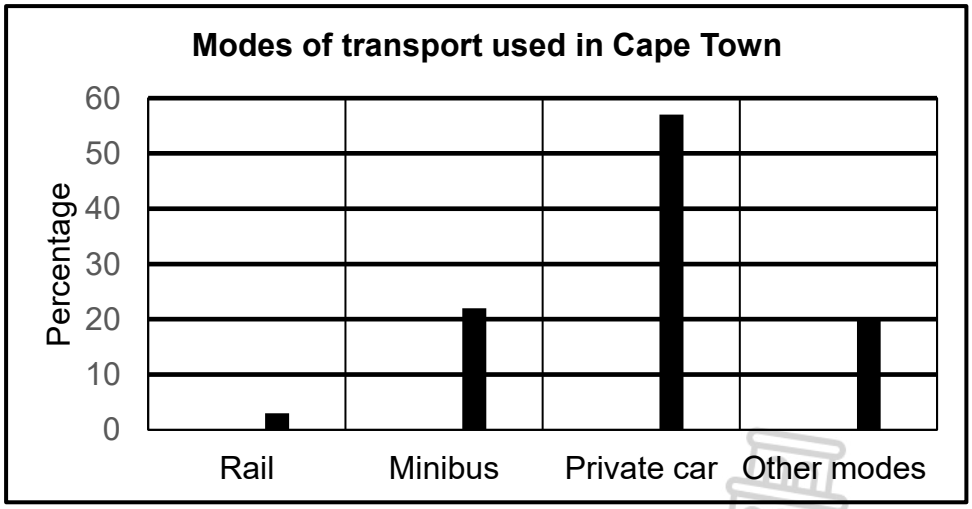
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3.6 Refer to the infographic on traffic congestion below.

Impact of Metrorail failure on Cape Town's traffic

Cape Town was the third most congested city in Africa in 2025, ahead of Johannesburg which sits at number six, and Cairo at 12th place. This is an improvement from being the second-most congested city on the continent in 2023. Globally, Cape Town sits at 91 out of 492 cities, according to the latest statistics on the tomtom Traffic Index.





[Source: https://images.caxton.co.za/wp-content/uploads/sites/6/2013/09/traffic-jam.jpg]

	3.6.1	Mention the global report used to compare traffic congestion between cities.	(1 x 1)	(1)
	3.6.2	Account for private cars being the most commonly used mode of transport.	(2 x 2)	(4)
	3.6.3	With reference to the picture, write a paragraph of approximately EIGHT lines discussing the negative environmental impacts of congested traffic and possible solutions included therein.	(4 x 2)	(8)

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KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

CURRICULUM GRADE 10 -12 DIRECTORATE

NCS (CAPS) SUPPORT

JUST IN TIME TEACHER DOCUMENT

GEOGRAPHY

MARKING GUIDELINE

GRADE 12

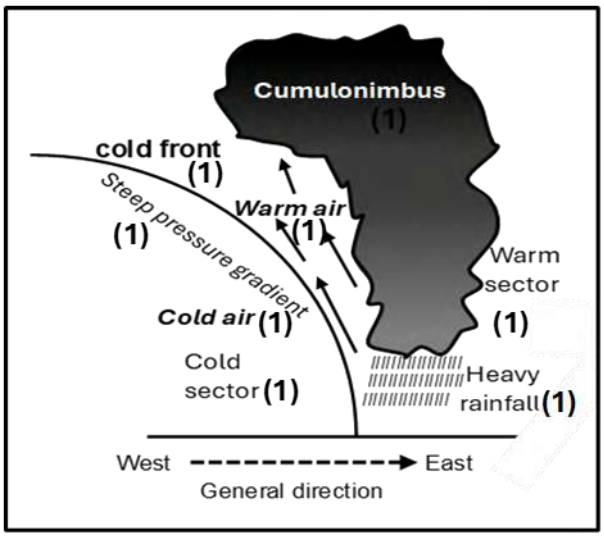
2026

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CLIMATE AND WEATHER

1.1.			
1.1.1	Windy (condition)/ strong wind (2)	(1 x 2)	(2)
1.1.2	 **[ANY FOUR LABELS]**	(4 x 1)	(4)
1.1.3	Cold dense air uplifted warm air rapidly (2) Cooling and condensation occurred due to updrafts (2) Cumulonimbus clouds formed, resulting to heavy rainfall (2) **[ANY TWO-]**	(2 x 2)	(4)
1.1.4	Satellite images take images from inaccessible areas (2) Tracking the severity of weather for early warnings (2) People would take necessary precaution (2) (accept examples) Data would be received in real time (2) **[ANY TWO-THERE MUST BE A FACTOR AND A QUALIFIER]**	(2 x 2)	(4)
1.1.5	Cold front brings heavy rainfall which leads to floods in low-lying areas (2) Low-lying areas normally have stream which can be full and wash away settlements (2) It takes time for water to drain away due to a sudden discharge of rivers in low-lying areas (2)		

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	Snow which accumulates as a result of extremely low temperatures leads to respiratory problems (2) (accept examples) It could be difficult to transport people to high-lying areas due to flooded roads and bridges (2) **[ANY THREE-THERE MUST BE A FACTOR AND A QUALIFIER]**	(3 x 2)	(6)

1.2.			
1.2.1	A (1)	(1 x 1)	(1)
1.2.2	Steep pressure gradient causes air to rush towards the low-pressure area (2)	(1 x 2)	(2)
1.2.3	It reached warm oceans (sea surface temperature above 26.5°C) and picked moisture (2) Low wind shear (2) High evaporation (humidity) due to latent heat (2) Strong Coriolis force (5°-25°S) (2) Upper air divergence (2) **[ANY TWO]**	(2 x 2)	(4)
1.2.4	The forward left-hand quadrant is the dangerous semi-circle and the direction to which the tropical cyclone is moving (2) It is the side where winds are stronger (above 120 km/h) and their speed easily sweep away buildings (2) Hailstorm and strong winds blew away roofs (2) Heavy rainfall caused saturated walls and collapsed (2) Exposure of the buildings to the open ground allowed high wind speed to travel freely and blew away buildings (2) Debris as a result of floods and winds could cause injury to people (2) **[ANY TWO]**	(2 x 2)	(4)

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1.3.			
1.3.1	Heat stroke/Heat exhaustion (1)	(1 x 1)	(1)
1.3.2	Increasing (2)	(1 x 2)	(2)
1.3.3	Kalahari High (1)	(1 x 1)	(1)
1.3.4	As air descends , it heats up adiabatically (1°C/100m) (2) Air blows from the interior to the coast (offshore) with little moisture (2)	(1 x 2)	(2)
1.3.5	**AMBULANCES** When there is a risk of injuries as a result of fires people could be rushed to hospital (2) Provision of first medical aid in case of suffocated people (2) (accept examples) **FIRE BRIGADES** To immediately cease (stop) fires (2) Rescue people who are stuck on smoke/ fires (2) Provision of first medical aid (2) **[ANY TWO- MUST INCLUDE BOTH ASPECTS]**	(2 x 2)	(4)
1.3.6	Practice hydration measures (2) (accept examples) Awareness through media (Firefighters to be on high alert in case of veld fires (2) Establishing firebreaks around settlements (2) Fire watch towers (2) Stay indoors/ avoid unnecessary travelling (2) Irrigate crops and vegetation early mornings and late afternoons (2) Keep livestock in an enclosed area in case of veld fires (2) 2) (accept examples) **[ANY FOUR]**	(4 x 2)	(8)

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1.4.			
1.4.1	A boundary between two air masses with different moisture content (2) **[CONCEPT]**	(1 x 2)	(2)
1.4.2	The winds are associated with cold air which is dense (heavy) (2)	(1 x 2)	(2)
1.4.3	The northeasterly winds rise as air is light (2) Warm moist air is uplifted by cold south-westerly winds (2) Warm and moist air is uplifted, cools and condensation occurs (2) Cumulonimbus clouds are formed due to rising air (2) Updrafts cause formation of water droplets thus lightning and line thunderstorm over a larger area (eastern part of SA) (2) **[ANY TWO]**	(2 x 2)	(4)
1.4.4	Heavy rainfall fills dams (2) Access of water for irrigation purposes (2) Access of water for crops (2) Increased profits (2) Access of water for livestock (2) Aquaculture is boosted (2) Farm labourers access water for domestic use (2) Possible use for hydro-electricity generation (2) Soils become saturated and reduce irrigation costs (2) Lightning deposits nutrients in the soil (soil fertility) (2) **[ANY FOUR]**	(4 x 2)	(8)

1.5.			
1.5.1	The direction in which a slope faces in relation to the sun rays (2) **[CONCEPT]**	(1 x 2)	(2)
1.5.2	The North facing slope is warmer (2) The north facing slope is receiving direct insolation (2) There is oblique sunlight in the south facing slope (2) **[ANY TWO]**	(2 x 2)	(4)

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1.5.3	North facing slopes are warmer hence the land values will be higher (2) (accept examples) South facing slope are colder hence the land values are lower (2) (accept examples) **[THERE MUST BE A FACTOR AND A QUALIFIER]**	(2 x 2)	(4)
1.5.4	In south facing slope lights are switched on earlier and switched off later which will increase electricity consumption (2) South facing slope is colder people will use more heat generating appliances which will increase electricity consumption (2) **[THERE MUST BE A FACTOR AND A QUALIFIER]**	(2 x 2)	(4)

1.6.			
1.6.1	The downslope wind that blows during the night in valleys (2) **[CONCEPT]**	(1 x 2)	(2)
1.6.2	It subsides due to the force of gravity (2) Cold air is heavy/ dense (2)	(2 x 2)	(4)
1.6.3	At **A** temperature cooled to below freezing point causing frost (2) At **B** temperature cooled to below dewpoint temperature causing radiation fog (2)	(2 x 2)	(4)
1.6.4	In the middle slopes, farmers can grow deciduous fruits (thin skinned) due to warm slopes (ripening and sweetening) (2) (accept examples) At the bottom of the valley, farmers can grow citrus fruits (thick skinned fruits) due to cool conditions (2) (accept examples) At the valley floor, frost resistant crops can be grown (2) (accept examples)	(2 x 2)	(4)
1.6.5	Large fans can be used which will prevent cold air from sinking (2) Using frost clothes or covers (2) Using lights which will warm up the slope (2)	(3 x 2)	(6)

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1.7.			
1.7.1	Lines connecting places with equal temperatures (2) **[CONCEPT]**	(1 x 2)	(2)
1.7.2	**A** is a pollution dome which is the accumulation of pollutants trapped above the city (2) **B** is urban heat island which refers to higher temperatures in urban areas as compared to rural surroundings (2)	(2 x 2)	(4)
1.7.3	At night there is more subsiding cold air (2) At tight there are weak convection currents (2)	(2 x 2)	(4)
1.7.4	During the day there is weak sinking air which pushes the inversion layer higher (2) During the day there are strong convection currents which pushes inversion layer higher (2)	(2 x 2)	(4)
1.7.5	Can result in acid rain which will corrode buildings/infrastructure (2) It will be expensive to renovate (2) Crops can be damaged by acid rain (2) (accept examples) Can results to respiratory diseases thus increasing medical expenses (2) **[ANY TWO]**	(2 x 2)	(4)
1.7.6	Planting more trees to reduce carbon dioxide (2) Decentralize commercial activities in urban (2) Introduce roof top gardens (2) Encourage building waterbodies such as swimming pools to serve as cooling effect (2) Charge cars when entering the city (2) Encourage lift clubs to reduce traffic in cities (2) Encourage use of bicycles (2) Encourage use of cycle lanes (2) Encourage use of green energy (2) **[ANY FOUR]**	(4 x 2)	(8)

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GEOMORPHOLOGY

2.1			
2.1.1	Watershed is the high lying area separating two drainage basins (2) while an interfluve is the high lying area separating two streams in the same drainage basin (2)	(2 x 1)	(2)
2.1.2	Source is the point where a river originates (1) while the mouth is a point where a river enters the sea (1)	(2 x 1)	(2)
2.1.3	Main river is a river that flows from source to mouth (1) while a tributary is a small stream that joins the main river (1)	(2 x 1)	(2)
2.1.4	Drainage basin is an area drained by the main river and its tributaries (1) while a river system is the main river and its tributaries (1)	(2 x 1)	(2)
2.1.4	Surface run off is water that runs on the earth's surface after rainfall (1) while infiltration is water that seeps into the soil (1)	(2 x 1)	(2)
2.1.5	Catchment area is the area where the river collects its headwaters (upper reaches of the river) (1) while water table is the upper limit of ground water (1)	(2 x 1)	(2)

2.2			
2.2.1	Deranged pattern often develops in gentle slopes therefore water cannot move freely (2)	(1 x 2)	(2)
2.2.2	It has tributaries that join the main river at acute angle (2) It resembles the branches of a tree (2)	(2 x 2)	(4)
2.2.3	Dendritic pattern has rocks that are uniformly resistant to erosion (2) Trellis has alternate layers of hard and soft rocks (2)	(2 x 2)	(4)
2.2.4	**Similarities** They both have tributaries which join the main river at acute angles (2) **Differences**		

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	Parallel has long tributaries (2) Parallel has tributaries that are parallel to each other (2) **[ANY TWO-INCLUDE ONE SIMILARITY AND ONE DIFFERENCE]**	(2 x 2)	(4)
2.2.5	There are many joints with tributaries making right angle bends/ join the mainstream at right angle (2)	(2 x 2)	(4)

2.3			
2.3.1	Drainage density refers to the measure of total length of streams per unit area (2) **[CONCEPT]**	(1 x 2)	(2)
2.3.2	At drainage basin A there is a gentle slope resulting in more infiltration and low drainage density (2) At drainage basin A there is low rainfall resulting in more infiltration and low drainage density (2) At drainage basin A there is porous rock resulting in more infiltration and low drainage density (2) At A there is permeable rock resulting in more infiltration and low drainage density (2) At drainage basin A, there is more vegetation resulting in more infiltration and low drainage density (2) At drainage basin A there is dry soil allowing more infiltration and low drainage density (2) **[ANYONE]**	(1 x 2)	(2)
2.3.3	The heavier the rainfall the higher the drainage density (2) **[ANYONE]**	(1 x 2)	(2)
2.3.4	At A, there is more vegetation resulting in more infiltration and low drainage density (2) At A rocks are permeable allowing more infiltration and low density (2)	(2 x 2)	(4)
2.3.5	At B there is steep gradient resulting in more surface runoff and high drainage density (2) At B rocks are nonporous allowing more surface runoff and high density (2)	(2 x 2)	(4)

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2.4			
2.4.1	Stream ordering is a method of classifying streams in a drainage basin (2) **[CONCEPT]**	(1 x 2)	(2)
2.4.2	4th order (2)	(1 x 2)	(2)
2.4.3	When drainage density is high, stream order increases (2) When drainage density is low, stream order decreases (2) **[ANY TWO]**	(2 x 2)	(4)
2.4.4	The higher the amount of rainfall the higher the stream order (2) The lower the amount of rainfall the lower the stream order (2)	(2 x 2)	(4)

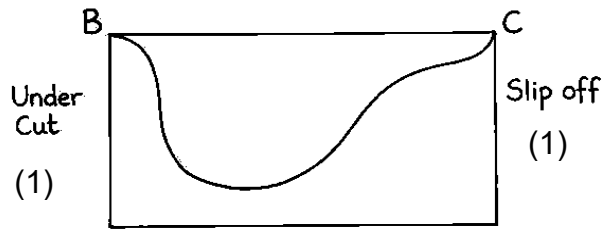
2.5			
2.5.1	River discharge refers to the flow of water in a river at a given period (2) **[CONCEPT]**	(1 x 2)	(2)
2.5.2	Laminar flow: water flows smoothly in thin layers (2) Turbulent flow :water flows in complex tumbling circulars (2)	(2 x 2)	(4)
2.5.3	Riverbed on laminar flow is even (2) Riverbed on turbulent flow is uneven (2)	(2 x 2)	(4)
2.5.4	Laminar flow is associated with low rate of erosion (2) Turbulent flow is associated with high rate of erosion (2)	(2 x 2)	(4)

2.6			
2.6.1	Longitudinal profile is a side view of a river from source to mouth (1) Cross profile refers to the view of the river from bank to bank (1)	(2 x 1)	(2)
2.6.2	V-shape forms as a result of vertical/ downward erosion (2)	(1 x 2)	(2)
2.6.3	Length (1) and gradient (1) of the river	(2 x 1)	(2)
2.6.4	The volume increases because the river has been joined by a number of tributaries (2)	(1 x 2)	(2)
2.6.5	The slope is gentle in the lower course which decreases velocity in the river (2)	(1 x 2)	(2)
2.6.6	**Economic**		

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	It is cheaper since the valley is narrow and deep (2) **Environment** Evaporation will be limited since less water is exposed to the sun (2)	(2 x 2)	(4)

2.7			
2.7.1		(2 x 1)	(2)
2.7.2	Feature B: undercut slope is gentle and associated with erosion (2) Feature C: slip off slope is gentle and associated with deposition (2)	(2 x 2)	(4)
2.7.3	Oxbow lake forms when there is erosion on the outer bank (2) and deposition on the inner bank (2) which makes the meander neck to become narrower (2) During floods the river flows straight (2) separating the meander loop from the mainstream (2) **[ANY THREE]**	(3 x 2)	(6)
2.7.4	Flood plains are gentle and can be used for settlement (2) Flood plains are gentle and can be used for farming (2) Flood plains are gentle allowing the use of machinery (2) Availability of water for irrigation (2) Fertile soils allow farming thus high profits (2) Access of water for domestic use (2) Abundance of water for aquaculture (2) **[ANY THREE]**	(3 x 2)	(6)

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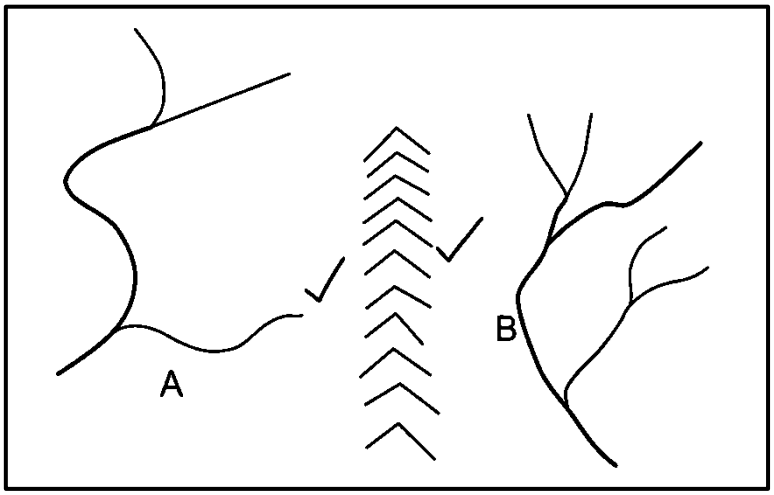
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2.8			
2.8.1	Waterfall is a sudden vertical drop along the river course (2) **[CONCEPT]**	(1 x 2)	(2)
2.8.2	They form obstruction along the river course (2) People can fall and get injured (2) **[ANYONE]**	(1 x 2)	(2)
2.8.3	Waterfalls can be used to generate hydroelectricity (2) Waterfall serves as tourist attraction (2)	(2 x 2)	(4)
2.8.4	Rock Z (soft rock) erodes faster (2) Rock Y (hard rock) does not erode faster and will be left overhanging (2) Since rock Y will be overhanging, it will collapse and fall causing the waterfall to retreat (2)	(3 x 2)	(6)

2.9			
2.9.1	River rejuvenation is a process whereby a river regains energy to erode vertically again (2) **[CONCEPT]**	(1 x 2)	(2)
2.9.2	Meanders will become incised meanders (2) Flood plains will become paired terraces (2)	(2 x 2)	(4)
2.9.3	Rivers will not easily overflow (2) Carrying capacity of the river increases (2) These landscapes can serve as tourist attraction (2) **[ANY TWO]**	(2 x 2)	(4)
2.9.4	It is difficult to access water (2) These landscapes are steep and not suitable for human activities (2) These landscapes are steep and are associated with erosion (2) **[ANY TWO]**	(2 x 2)	(4)

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2.10			
2.10.1	River capture refers to the process whereby a more energetic river robs headwaters of a less energetic river (2) **[CONCEPT]**	(1 x 2)	(2)
2.10.2		(2 x 1)	(2)
2.10.3	The river will have more volume of water (2) The river will have more erosive power (2) River will be rejuvenated (2) **[ANY TWO]**	(2 x 2)	(4)
2.10.4	**ECONOMIC** There will be less water for irrigation (2) There will be less water for livestock (2) There will be less water for industrial use (2) There will be less water for hydroelectricity (2) Financial loss due to decreased agriculture (2) **ENVIRONMENTAL** Ecosystem will be disrupted (2) Biodiversity will be disrupted (2) Food chains will be broken (2) Natural vegetation will be disrupted (2) **[ANY FOUR-LEANERS MUST INCLUDE BOTH ECONOMIC AND ENVIRONMENT]**	(4 x 2)	(8)

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2.11			
2.11.1	It refers to the sustainable use of water sources so that they are available to future generations (2) **[CONCEPT]**	(1 x 2)	(2)
2.11.2	The river is affected by large volumes of toxic coal mine waste (2) Toxic heavy metals such as arsenic copper, lead and manganese (2)	(2 x 2)	(4)
2.11.3	Ecosystem will be disrupted (2) Food chains will be broken (2) Animals will have no water for drinking (2) Plants may die (2) **[ANY TWO]**	(2 x 2)	(4)
2.11.4	Regular testing of water (2) Educate people to take care of rivers (2) Monitor illegal dumping on rivers (2) Fine people who pollute rivers (2) Preventing development closer to rivers (2) Buffer the rivers (2) **[ANY FOUR]**	(4 x 2)	(8)

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RURAL AND URBAN SETTLEMENTS

3.1				
	3.1.1	62% (2)	(1 x 2)	(2)
	3.1.2	The youth leave rural areas due to lack of jobs (2) Mechanisation of farms (2) Low salaries and wages (2) Poverty (2) Lack of entertainment (2) Poor health care services (2) [accept examples] Poor roads (2) Fewer educational institutions (2) [accept examples] Lack of infrastructure (2) [accept examples] Lack of basic services (2) [accept examples] Livestock and crop diseases (2) [accept examples] Natural disasters (2) [accept examples] Lack of proper housing (2) **[ANY TWO]**	(2 x 2)	(4)
	3.1.3	Businesses close resulting to a decrease in economic base (2) [accept examples] Crop production decreases thus a reduction to profits (2) Brain drain resulting to slow economic growth (2) Reluctance of business owners to invest in rural areas (2) [accept examples] Underutilisation of resources (2) [accept examples] Ageing (downgrading) of infrastructure decreases profits i.e. transport industry (2) **[ANY TWO]**	(2 x 2)	(4)
	3.1.4	**Employment** Variety of employment opportunities/ increased employment will increase the standard of living (2) Variety of employment opportunities/ increased employment will alleviate poverty (2)		

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		Variety of employment opportunities/ increased employment will increase affordability/ purchasing power (2) Variety of employment opportunities/ increased employment will increase food security (2) Variety of employment opportunities/ increased employment will increase local income (2) **Infrastructure** Improved infrastructure strengthens access to transport (2) Improved digital infrastructure strengthens local development (2) [accept examples] Improvement of infrastructure creates job opportunities (2) Improved infrastructure guarantees access to basic services/facilities (2) [accept examples] **[ANY TWO- THERE MUST BE A FACTOR AND A QUALIFIER]**	(2 x 2)	(4)

3.2				
	3.2.1	It is a government bill aimed at taking land ownership from private owners thus providing the public, without paying the owner (2) **[CONCEPT]**	(1 x 2)	(2)
	3.2.2	To promote economic growth (2) To alleviate poverty (2) To facilitate agricultural production (2) For national reconciliation and stability (2) **[ANY TWO]**	(2 x 2)	(4)
	3.2.3	Through land reform, people will be employed from agriculture (2) Access to jobs alleviate poverty (2) Commercial farming will increase profits/ local economy (2) Available land will enable people to build homes (2) Available land enables the provision of basic services (2) [accept examples] Available land will attract investors (2) Arable land promotes farming thus food security (2)		

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		Access to land will promote a variety of business opportunities (2) [accept examples] **[ANY TWO- THERE MUST BE A FACTOR AND A QUALIFIER]**	(2 x 2)	(4)
	3.2.4	The willing buyer willing seller clause halt negotiations (2) Lack of training and support for new beneficiaries (2) Disagreements between the government and the traditional leaders in terms of land redistribution and restitution (2) Some beneficiaries accessed land without any agricultural knowledge (2) Claim disputes have taken so long (2) There are existing gaps in the land reform policy (2) The move from subsistence to commercial farming has not adequately taken place even to date (2) Poverty is still not alleviated (2) **[ANY FOUR]**	(4 x 2)	(8)

3.3				
	3.3.1	The unequal/unfair opportunities created to meet the basic needs of the people (2) **[CONCEPT]**	(1 x 2)	(2)
	3.3.2	Lack of water (1) Slow land reform (1)	(2 x 1)	(2)
	3.3.3	Walking long distances to collect unsafe water (1) Increased risks of diseases (1) Lost school time (1) **[ANY TWO]**	(2 x 1)	(2)
	3.3.4	Fixing possible leaks (2) Penalising illegal connections (2) Public awareness campaigns (2) Encourage rainwater harvesting (2) Establishing inter-basin transfer schemes (2) (accept examples) Eradicating invasive plant species (2) Water conservation methods (2) (accept examples) Responsible use of ground water (2) (accept examples)		

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		Water purification (2) Protecting wetlands (2) Buffering rivers (2) (accept examples) **[ANY THREE]**	(3 x 2)	(6)

3.4				
	3.4.1	A settlement that provides goods and services to the surrounding rural population (2) **[CONCEPT]**	(1 x 2)	(2)
	3.4.2	Sphere of influence (1)	(1 x 1)	(1)
	3.4.3	They are cheap/ affordable (2) People usually walk short distance to obtain them (2) They are needed frequently (2) **[ANYONE]**	(1 x 2)	(2)
	3.4.4	A spaza shop will need a small threshold population to be profitable (2) A Volkswagen garage will need a large threshold population to be profitable (2)	(2 x 2)	(4)
	3.4.5	A local salon will have a shorter range because it provides low order services (2) A regional shopping centre will have a greater range because it mainly sells high order goods and services or low order goods in bulk (2)	(2 x 2)	(4)

3.5				
	3.5.1	**W**: transition zone (1) **Z**: heavy industrial zone/ industrial zone (1)	(2 x 1)	(2)
	3.5.2	It is the future expansion of the CBD (2)	(1 x 2)	(2)
	3.5.3	Lack of maintenance makes the transition zone dilapidated (eyesore) (2) Graffiti on the walls makes the transition zone unattractive (2) Vacant buildings attract criminals (2) Illegal occupation of buildings attract illegal immigrants (2)		

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		Broken windows and doors demand high costs for repairs (2) Mixed land uses creates uncertainty to the land value (2) **[ANY TWO]**	(2 x 2)	(4)
	3.5.4	The heavy industry emits a lot of air pollution (2) Residents will experience respiratory diseases due to smoke (2) [accept examples] Vehicles from heavy industries cause unpleasant noise to residents (2) Heavy industries ruin aesthetic appeal of residences (2) Air pollution decreases property value (2) **[ANY TWO]**	(2 x 2)	(4)
	3.5.5	Land is cheaper (2) There is plenty of space (2) There is access to major transport routes (2) There is access to customers (2) **[ANY THREE]**	(3 x 2)	(6)

3.6				
	3.6.1	Tomtom Traffic Index (1)	(1 x 1)	(1)
	3.6.2	Private cars are convenient (2) (accept examples) Some cars save fuel (2) Motorists enjoy flexible schedules (2) (accept examples) Motorists have safety concerns (2) Private cars are more reliable when travelling to work (2) **[ANYONE**	(2 x 2)	(4)
	3.6.3	**NEGATIVE ENVIRONMENTAL IMPACT** Air pollution (2) Noise pollution to animals (2) Water pollution due to oil spillage (2) Increased temperature and oil spillage may kill plants and animals (2) Low air quality due to smoke (2) Greenhouse emission destroy the ozone layer (2)		

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		SOLUTIONS Stringent monitoring of public transport (2) Use other viable form of transport (2) (accept examples) Use of cycle lanes (2) Encourage use of public transport (2) Park and ride facilities (2) Charging cars entering the CBD (2) Staggered working hours (2) One way streets (2) Synchronizing robots (2) **[ANY FOUR- CANDIDATES MUST INCLUDE BOTH ASPECTS]**	(4 x 2)	(8)

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