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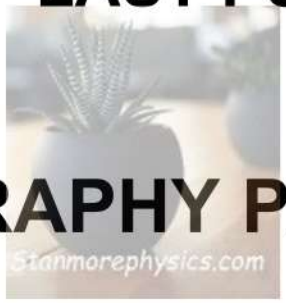
KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

CURRICULUM GRADE 10 -12 DIRECTORATE

NCS (CAPS) SUPPORT

JUST IN TIME LEARNER REVISION DOCUMENT

LAST PUSH



GEOGRAPHY PAPER 1 & 2

GRADE 12

2026

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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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MID- LATITUDE CYCLONES

Other names: Extra-Tropical Cyclone, Frontal Depression, Wave cyclone or Temperate Cyclone

GENERAL CHARACTERISTICS:

- They occur between 30° to 60° North and South of the equator.
- They generally move from West to East.
- They are steered/ driven by Westerlies.
- They occur throughout the year but affect SA weather in Winter.
- Consist of two fronts (cold and warm front) and two sectors (cold and warm sector).

NECESSARY CONDITIONS FOR THE FORMATION:

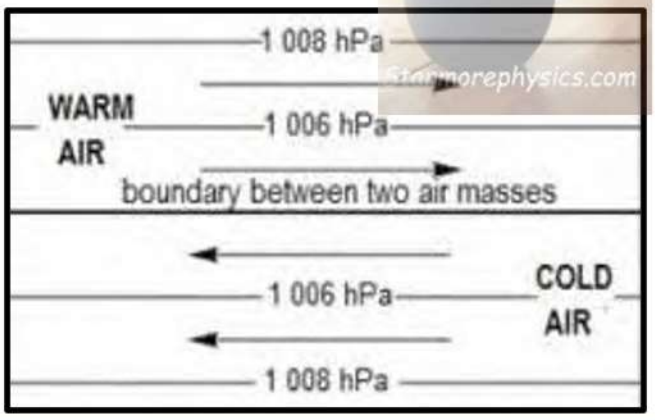
- Warm Westerlies N/S meet cold Polar Easterlies) N/S along Polar front/ at 60° N/S.
- Both air masses move parallel to each other in opposite direction.
- Frictional drag occurs between two air masses which causes rotation.
- Frictional drag occurs as a result of wind speed, uneven land surface such as mountains.

STAGES OF DEVELOPMENT

1. INITIAL STAGE:

- Warm westerlies (30° N/S) meet with cold polar (90° N/S) along polar front (60° N/S)
- Coriolis force deflect both air masses in Southern Hemisphere towards left causing it to move parallel to each other in opposite direction
- Polar front is stationary.

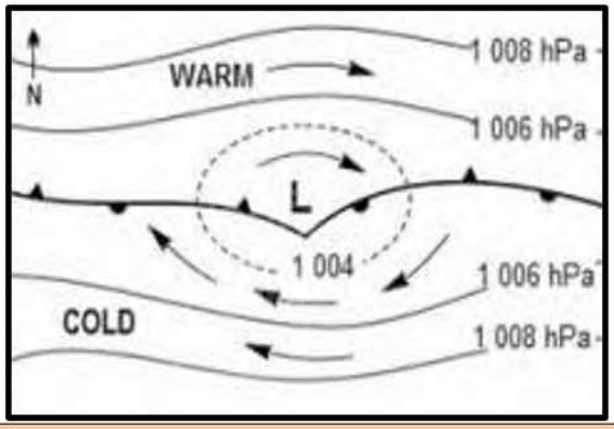
[source: https://mlcstages.02/.co.za]



2. WAVE FORMATION:

- The wave develops along Polar front due to frictional drag between two air masses
- A wedge of warm air began to be uplifted by cold air
- Fronts began to form as the air converge in a clockwise direction in Southern Hemisphere.

[source: https://mlcstages.02/.co.za]



3. MATURE STAGE

- Wave deepens and intensifies.
- Cold and warm front are fully developed in a well-defined V- shaped
- Behind cold front there is cold sector

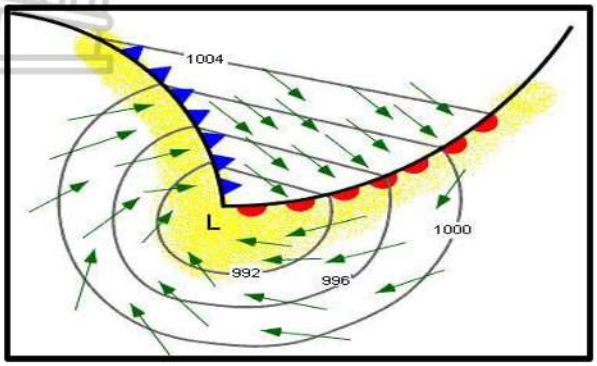
4. OCCLUSION STAGE

- Cold air moves faster than warm air.
- This will cause cold front to catch up (merge) with warm front at the apex.

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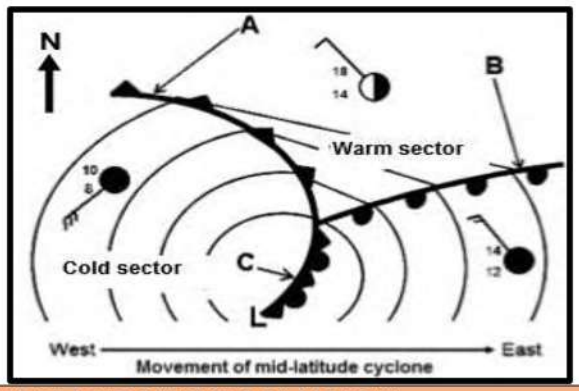
- Behind warm front there is warm sector
- Cooling condensation, cloud formation and rainfall associated with warm rising air along cold front.

[source: https://mlcstages.02/.co.za]



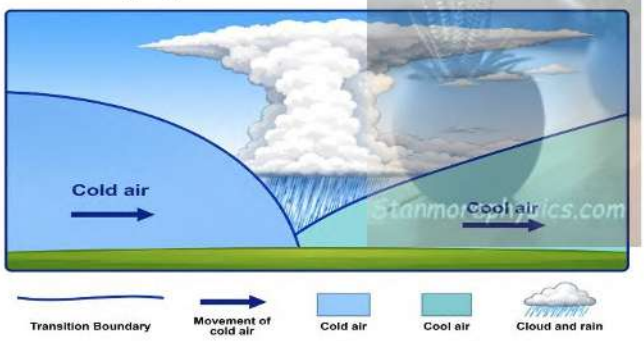
- Occlusion start at the apex because it is the shortest distance between two fronts.
- There are two types of occlusion warm front occlusion and cold front occlusion.

[source: https://mlcstages.02/.co.za]



COLD FRONT OCCLUSION:

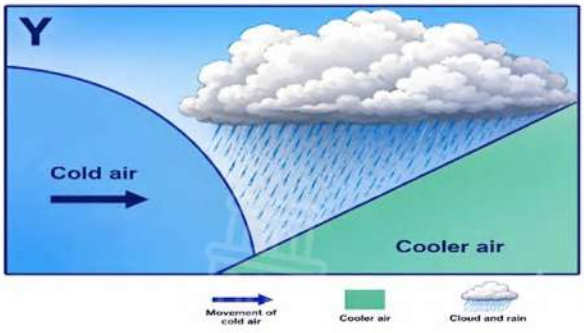
- Cold front which moves faster undercuts/ overtakes the warm front.
- Warm air is forced to rise over cold air resulting in the narrowing of the warm sector.
- Warm air becomes completely uplifted which results in the system surrounded entirely by cold air.



[source: Adapted from Gemini AI]

WARM FRONT OCCLUSION:

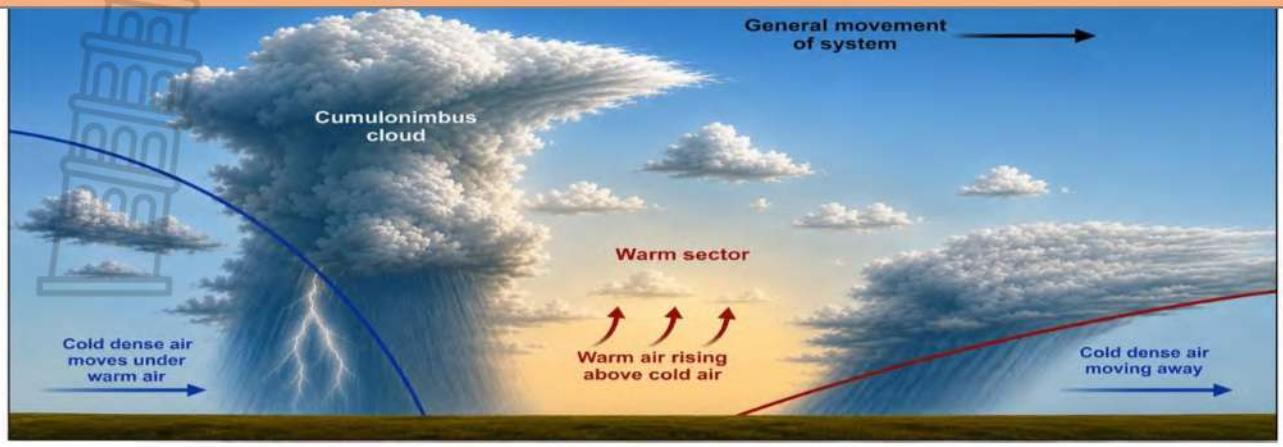
- Cold air is found ahead of the system.
- This cause warm front to move slower narrowing the warm sector.
- Cold air and cold front overrides warm front and cold air.
- Resulting in warm front occlusion.



[source: Adapted from Gemini AI]

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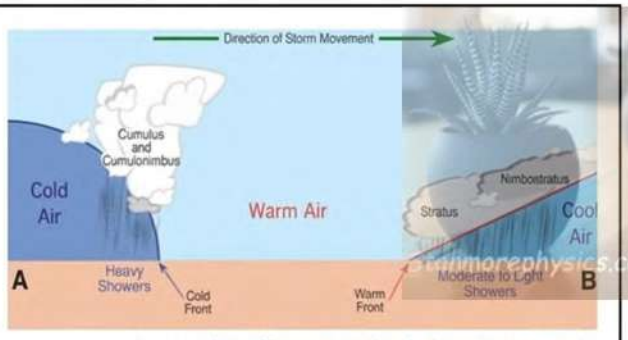
CROSS SECTION THROUGH A MID – LATITUDE CYCLONE



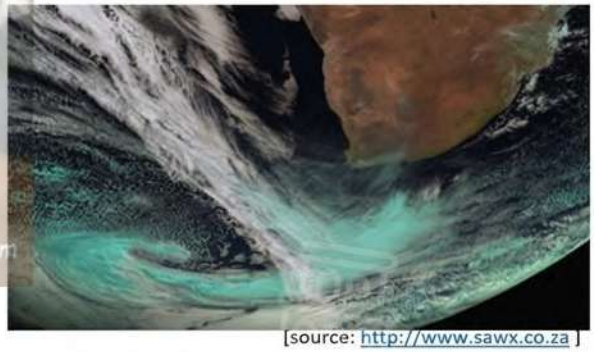
[source: Adapted from Gemini AI]

WEATHER ELEMENT	COLD FRONT	WARM FRONT
Temperatures	Drops rapidly	Rises
Wind speed	Strong gusty winds	increases
Air pressure	Steep rise in pressure	Drop rapidly
Humidity	Initially high	increases
Precipitation	Heavy rains, thunder and lightning	light rains occur

Refer to the following infographic on mid-latitude cyclones.



[source: http://www.pressbooks.bccampus.co.za]



[source: http://www.sawx.co.za]

SA WEATHER SEVICE ISSUE LEVEL 2 AND 4 WARNINGS AS COLD FRONTS APPROACH

The South Africa Weather Service (SAWS) has issued yellow level 2 and 4 warnings for severe weather conditions expected across several provinces from Thursday, 3 July, through Sunday, 6 July.

A series of cold fronts is forecast to sweep across the country, beginning Thursday and continuing through the weekend. The Western Cape and Northern Cape will be mostly affected, with weather impact also likely to extend into parts of Free State and Eastern Cape.

Strong winds will accompany the rain, particularly along the South-Western coastline. Gusts of up to 80 km/hr are anticipated between Saldanha Bay and Cape Agulhas on Friday. This trigger the yellow 2 wind warning for the day

[adapted from: http://.www.ewn.co.za]

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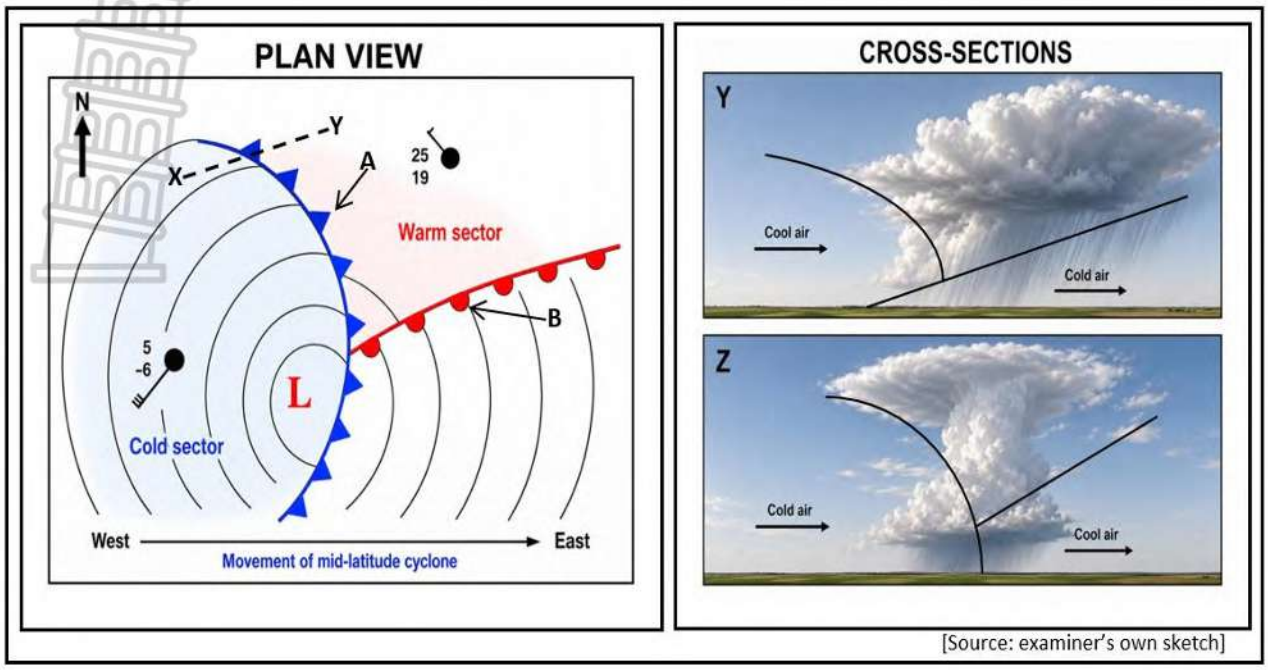
1.1.1	In which direction does the mid-latitude cyclone move?	(1 x 1)	(1)
1.1.2	Give the reason for the movement mentioned in QUESTION 1.1.1.	(1 x 1)	(1)
1.1.3	Account for the cumulonimbus clouds developing ahead of cold front?	(1 x 2)	(2)
1.1.4	Identify the stage of development shown in the satellite image?	(1 x 1)	(1)
1.1.5	Give TWO reasons for your answer in QUESTION 1.1.4.	(2 x 2)	(4)
1.1.6	State TWO weather elements associated with this system according to the extract.	(2 x 1)	(2)
1.1.7	Predict the negative impact of this weather system on farming as it passes over Saldanha Bay.	(2 x 2)	(4)

IMPACT OF MID-LATITUDE CYCLONE		
SOCIAL	**ENVIRONMENTAL**	**ECONOMIC**
• Heavy rains cause flooding. • Floods cause people and livestock to be drawn. • Flooding and poor sanitation contaminate water leading to waterborne diseases. • massive flooding trigger food insecurities, starvation and malnutrition.	Heavy rains associated with floods may cause: • Excessive soil erosion (loss of top fertile soil) • Destroy natural habitat • Destroy ecosystem and biodiversity • Disrupt food chains and food webs • May trigger mass wasting	• Excessive rainfall and flooding wash away crops and livestock reducing agricultural output. • Rise in food prices. • Less agricultural export and more importation of food. • Less foreign exchange and foreign investment. • Unemployment rate increases.

Stanmorephysics.com

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1.2. Refer to sketches below on a mid- latitude cyclone.



[Source: examiner's own sketch]

Refer to the plan view.

1.2.1 Identify front **A**. (1 x 1) (1)

1.2.2 Which one between front **A** or **B** is moving faster? (1 x 1) (1)

1.2.3 Give the reason for your answer in QUESTION 1.2.2. (1 x 2) (2)

1.2.4 Give evidence from the sketch that the mid- latitude cyclone is found in the Southern Hemisphere. (1 x 2) (2)

1.2.5 Draw a cross section of front **A**, from **X** to point **Y** clearly indicate the following:

- Correct cross- section
- Air movement along cold front
- Cloud type
- Sectors

(4 x 1) (4)

Refer to cross- sections

1.2.6 Identify the type of occlusion represented by **Z**. (1 x 1) (1)

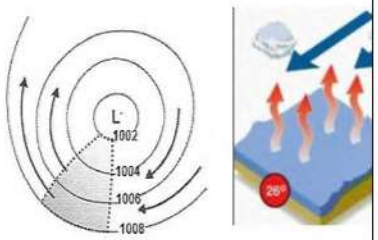
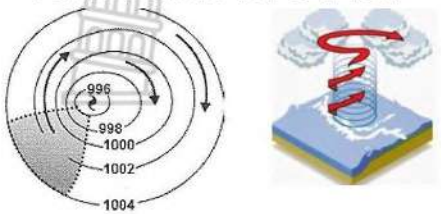
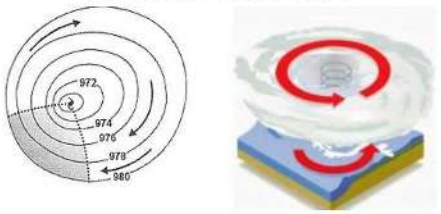
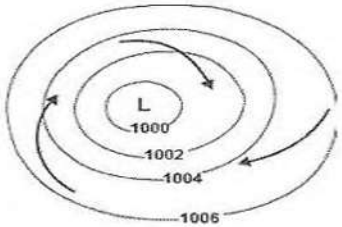
1.2.7 Explain how the occlusion mentioned in QUESTION 1.2.6 develops? (2 x 2) (4)

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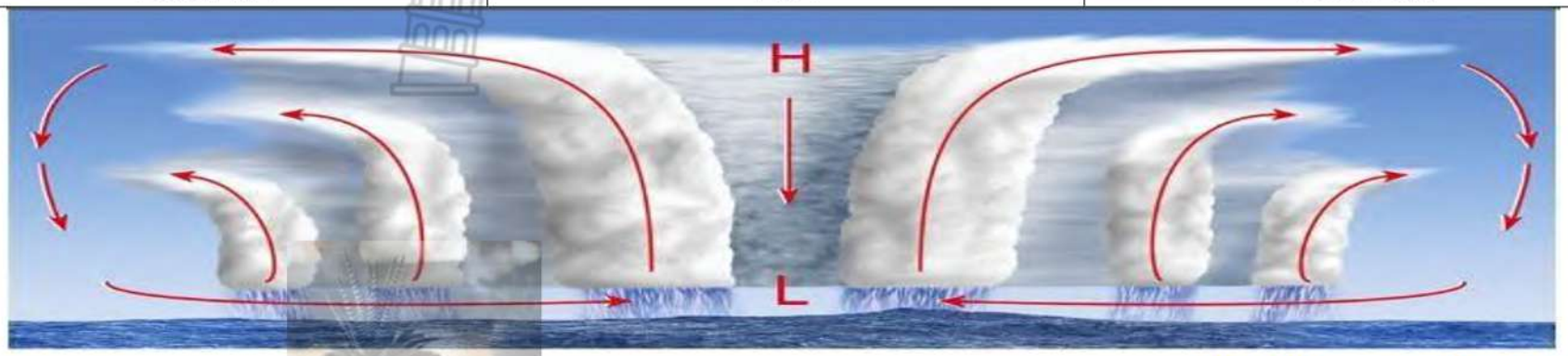
TROPICAL CYCLONE		
OTHER NAMES	**CHARACTERISTICS**	**NECESSARY CONDITIONS**
• Hurricane (North America) • Willy Willies (East Australia) • Typhoons (South East Asia), • Cyclones (India and Mauritius) • Tropical Cyclone (Madagascar and South Africa)	• It occurs between 5° N/S to about 25° (30°) N/S of the equator • Moves from East to West • Driven by Tropical Easterlies • Occurs in summer • Has an eye and two vortexes.	• Develop only over a warm tropical ocean with surface temperature of 26.5 °C and above. • Hot moist air because of evaporation. • Unstable air results in condensation. • Less friction over a smooth surface. • High evaporation rate to feed the LP system • Condensation release latent heat.



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DEVELOPMENT STAGES OF A TROPICAL CYCLONE			
INITIAL STAGE	**DEVELOPMENT STAGE**	**MATURE STAGE**	**DECAYING STAGE**
			
			[Source: https://tropical_cyclone_stages01-453.co.za]
• Convergence of air towards low pressure creates a vortex • Air pressure about 1002 hPa • Wind speeds up to 60 km/h	• Intensity of storm increases as air continues to converge and rise in LP Centre • Divergence takes place in upper atmosphere Air pressure drops below 990hPa • Wind speed increases to about 120 km/h • Eye forms in Centre of LP • Huge cumulonimbus clouds forms around the eye and swirls to form a vortex • Artificial Eye Wall	• Storm reaches its maximum intensity • Pressure drops to about 950 hPa • Wind speed exceeds 180 km/h • Fully developed eye • Eye is clear, cloudless due to cooler subsiding air Vortex well developed • Wind speed and up to 600 km in diameter • Torrential rain, thunder and lightning.	Decays when: • It enters the land as the land, friction slows it down. • When it enters the land it losses moisture supply • Cooler air enters the system and increase pressures • When it is in the path of advancing cold front cold air increase pressure

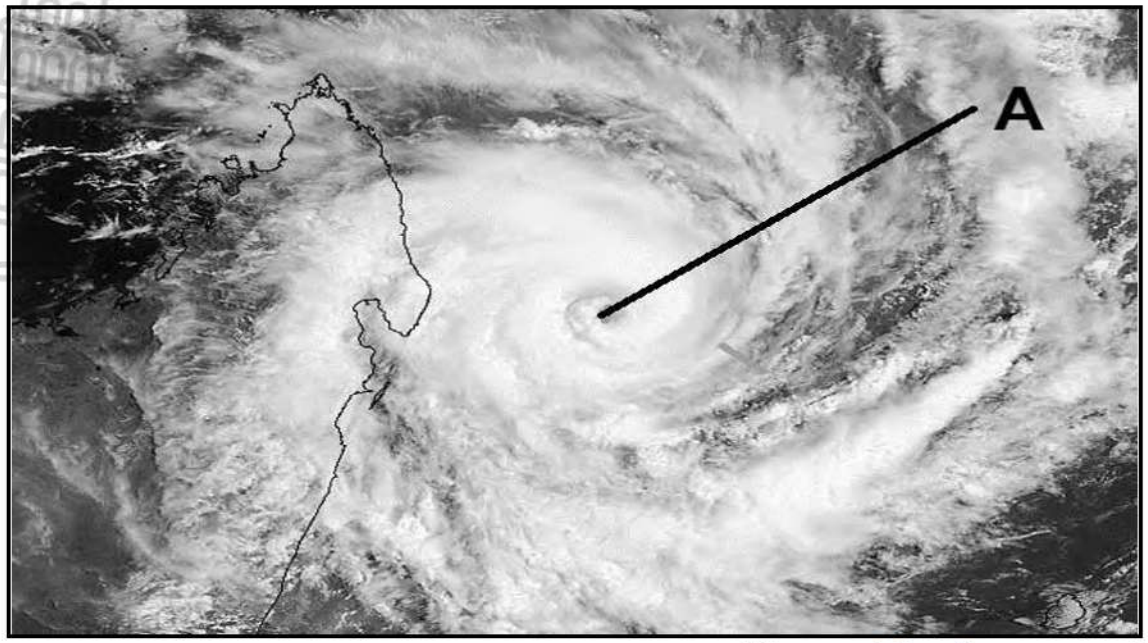
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CROSS SECTION THROUGH A TROPICAL CYCLONE		
VORTEX 1	**EYE**	**VORTEX 2**
		
		[Source: https://tc_eye_cyclones.co.za]

• Drop in pressures
• Towering cumulonimbus clouds
• Dangerous semi-circle conditions:
  ○ Disruptive winds (gale force winds)
  ○ Storm surges
  ○ Rough seas
  ○ Torrential rains
• Severe weather conditions are experienced in the eye well of the vortex
	• Calm (no wind)
	• Clear (no rain/ cloudless)
	• Lowest air pressure
	• Subsiding cold air
	WHY THERE ARE CLEAR SKIES?
	• The upward spiralling of air creates an artificial wall around the centre, this prevents surface air from rising and cooling therefore, no condensation occurs to produce clouds and rainfall
	• Subsiding air is heated adiabatically as it descends which cause moisture to evaporates
		• Air pressures are initially low and start rising
		• Wind speed are high closer to the eye wall and decrease outwards
		• Rainfall initially high and decrease outwards
		• Once this vortex makes landfall the cyclone starts to dissipate as moisture supply is cut off

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1.3. Refer to satellite image showing a tropical cyclone.



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

1.3.1	In which hemisphere is the weather system illustrated occurring?	(1 x 1)	(1)
1.3.2	Give a reason for your answer to QUESTION 1.3.1	(1 x 1)	(1)
1.3.3	State ONE condition required for the formation of weather system illustrated by the satellite image.	(1 x 1)	(1)
1.3.4	Name the feature labelled **A** on the satellite image	(1 x 1)	(1)
1.3.5	Explain why **A** experience clear skies	(1 x 2)	(2)
1.3.6	Draw a plan view of a synoptic representation of the weather system depicted from the satellite image and fully label the following: a) EYE b) Pattern of isobars c) Air circulation d) Pressure readings at the centre	(4 x 1)	(4)
1.3.7	Write a paragraph of approximately Eight lines to discuss the negative social and environmental impact of this weather system.	(4 x 2)	(8)

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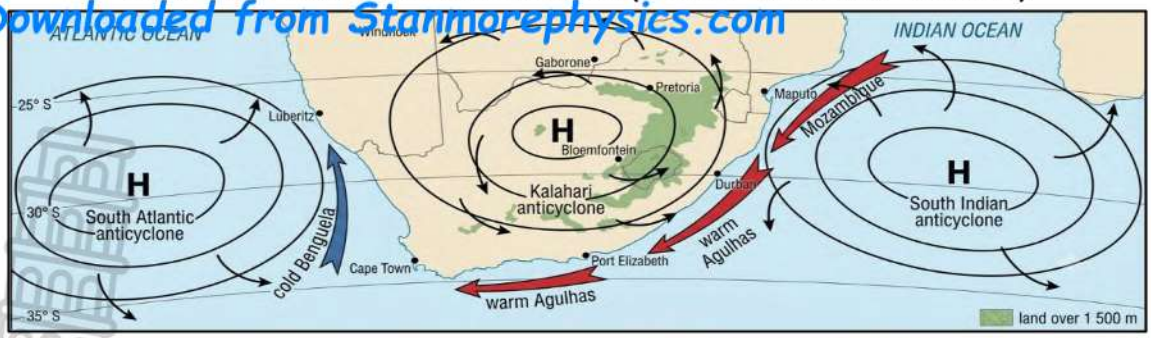
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IMPACT ON SOCIAL, ECONOMY AND ENVIRONMENTAL		
SOCIAL	**ENVIRONMENT**	**ECONOMY**
• Cause torrential rain and risk of flooding • Strong winds damage power lines, shatter windows and rip off roofs • Storm surges cause damage to the coastal areas Damage infrastructure: roads and bridges washed away • Loss of homes, Starvation • Water and sewerage pipes damaged	• Strong winds cause storm surges which can cause rapid rise in sea levels • Swell of waves is dangerous for fisherman • Floods and salt water destroy agricultural crops • Flooding and rise in river levels because of rain can cause mudslides and landslides	• Airports are closed • Damage harbour facilities • Businesses are closed • No trading is possible • Costly repairing damages • Job losses, unemployment

STRATEGIES TO MINIMISE THE IMPACT OF TROPICAL CYCLONES	
• Monitoring the development of Tropical cyclones • Satellite tracking can monitor the development and path • Advanced weather predictions and warnings • Satellite born censors to collect details e.g. rainfall rates • Early warning and communication for people to prepare • Evacuate low lying areas to protect against floods • Ensure that infrastructure is of good quality	• Keep livestock in barns to protect them against the wind and rain • People should stay indoors to protect them against flying debris, wind and rain • Upgrade technology in LEDC countries • Good medical care will reduce outbreak of deceases • Good emergency services that are well-equipped • Local civic services should be well-prepared to assist

SUBTROPICAL ANTICYCLONES (HIGH PRESSURE CELLS)

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[Source: https://www.anticyclones_hp.co.za]

- These weather systems are called Anticyclones because air circulates anticlockwise around them.
- **Pressure cells** air pressure increases towards the centre of these systems.
- **Inversion layer: increase in temperature with an increase in height**
- The south Atlantic and South Indian migrate north in winter close to mainland, south away from mainland in summer with the apparent migration of the ITCZ (thermal belt).

WINTER CONDITIONS

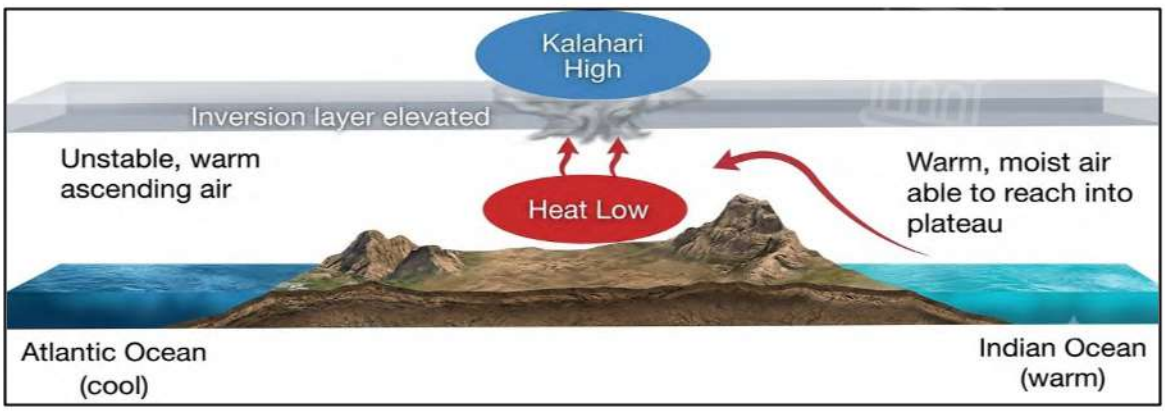


[Source: : https://www.anticyclones_hp.co.za]

- The Kalahari high descends with strong subsiding (sinking /descending)
- Descending air warm adiabatically and inversion layer is created, pushed closer to the surface.
- The interior experiences dry, clear sky conditions with sunny mid-days and very cold nights.

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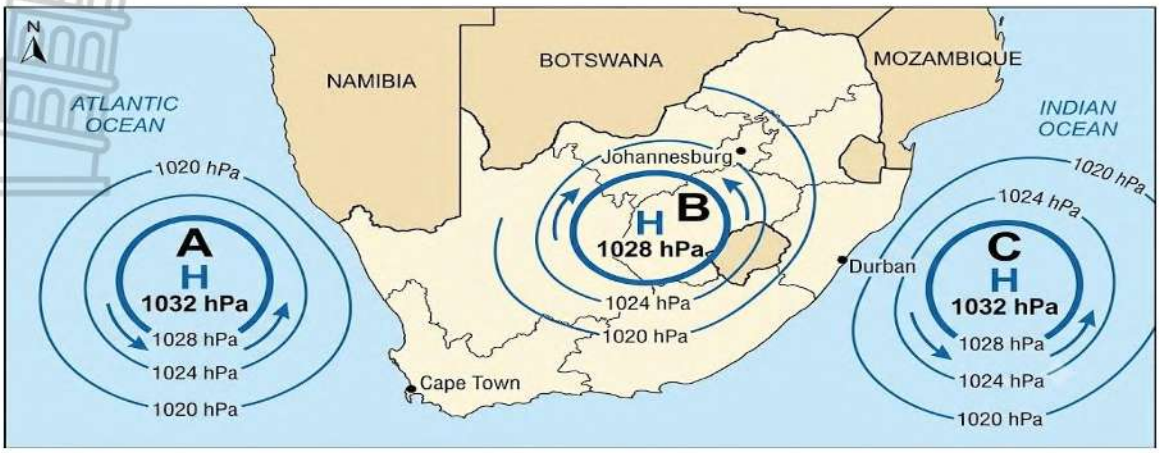
SUMMER CONDITIONS



- In summer the interior experiences high temperatures, terrestrial radiation forms strong convectional currents (vertically rising air), creating a heat low pressure
- Warm, moist maritime air is advected into the interior causing unstable conditions, bringing rainfall, convectional thunderstorm or line thunderstorms.

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1.4 Study the illustration on anti-cyclones below.



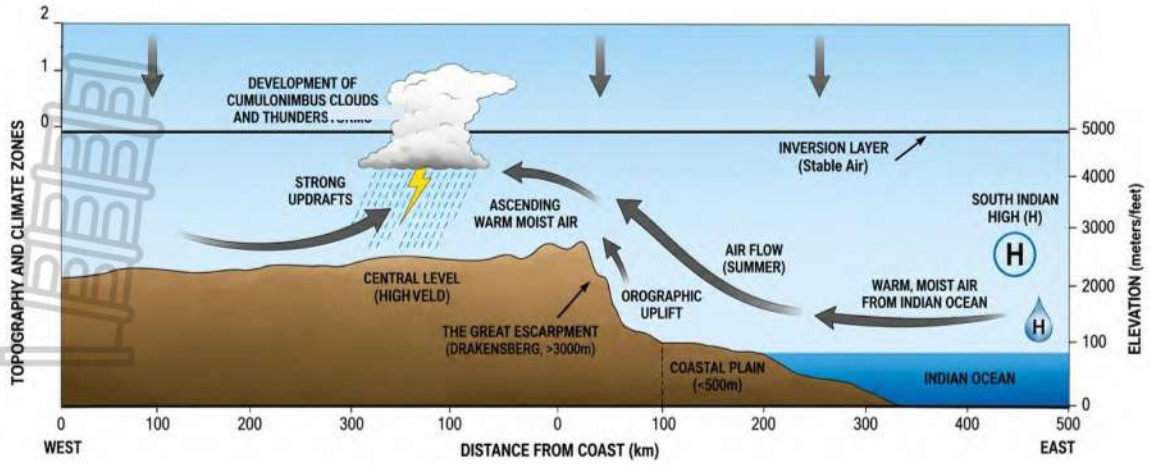
[Source: Adapted from ChatGPT]

1.4.1	Pressure cell **A** is….	**Y**: South Atlantic high **Z**: South Indian high	
1.4.2	Air pressure is…. towards the centre of pressure cell **C**	**Y**: Increasing **Z**: Decreasing	
1.4.3	Pressure cell **B** is dominant over the land in….	**Y**: Summer **Z**: Winter	
1.4.	Air circulation around pressure cell **A** is….	**Y**: Anticlockwise **Z**: Clockwise	
1.4.5	Pressure cell **C** is found…. from the land	**Y**: Closer **Z**: Away	
1.4.6	As a result of (answer to 1.4.5) there will be…. fetching distance	**Y**: Larger **Z**: Shorter	
1.4.7	Air diverging out of pressure cell **A** is….	**Y**: Cold and dry **Z**: Warm and moist	
1.4.8	Pressure cell **A** and **C** shift…. During summer	**Y**: Northwards **Z**: Southwards	

(8 x 1) (8)

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1.5 Refer to the diagram below showing the position of the inversion layer



[Source: gemini ai]

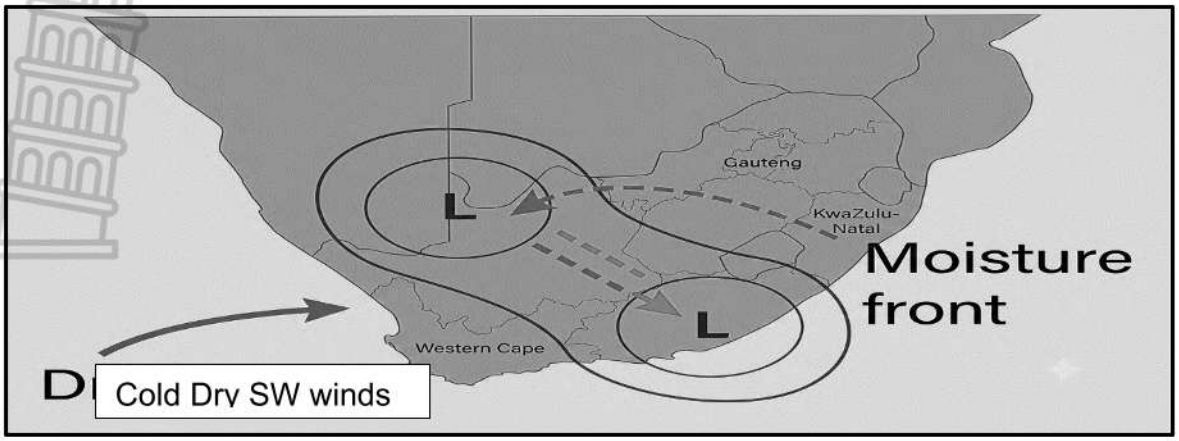
1.5.1	Identify the season depicted (shown) in the diagram.	(1 x 1)	(1)
1.5.2	Provide a reason for your answer in 1.5.1	(1 x 2)	(2)
1.5.3	Describe temperature characteristics of air in the Indian ocean as seen in the diagram	(1 x 1)	(1)
1.5.4	Provide a reason for the temperature characteristics described in 1.5.3	(1 x 2)	(2)
1.5.5	Account for the position of inversion layer in the diagram above	(1 x 2)	(2)
1.5.6	Explain the influence that the position of inversion layer will have in the formation of rainfall in South Africa	(3 x 2)	(6)

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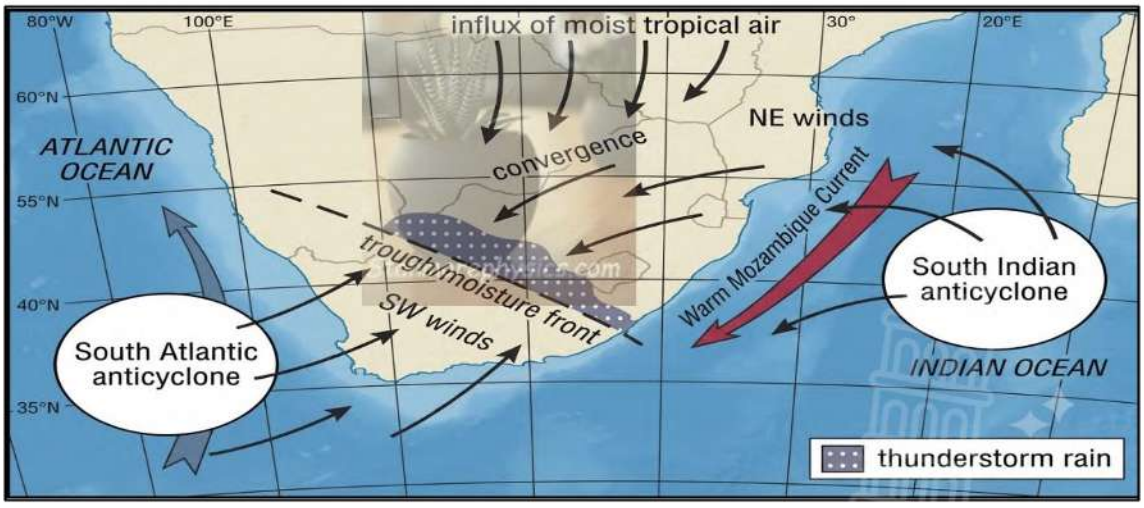
TRAVELLING DISTURBANCES ASSOCIATED WITH ANTICYCLONIC CIRCULATION

MOISTURE FRONT AND LINE THUNDERSTORMS



- **Moisture front:** a zone of separation (discontinuity) between air masses of different moisture content(humidity)
- Develops over the interior during summer because of high temperatures, form a thermal low/heat low and the coastal low positioned South-East coast.
- The corresponding position of the thermal low (heat low) over the mainland (near Namibia) and the coastal low to the south- east creates a trough of low-pressure cells

LINE THUNDERSTORMS



[Source: https://www.summer_thunderstorms.co.za]

- Systems that develop on the eastern side of the moisture front in the interior of SA.
- The heat low/thermal low dominates the interior during summer
- Warm, moist (NE) air from the South Indian (anticyclone) is drawn towards the trough on eastern side following a pressure gradient

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- Cold, dry SW air from the south Atlantic high (anticyclone) is drawn towards the trough on the western side following a pressure gradient
- The SW air and NE air converges at the moisture front.
- The cold, dry air is dense, undercuts the warm, moist air on the eastern side, forcing it to rise rapidly to greater heights along the moisture front.
- The rapid rise of warm, moist air on the eastern side leads to greater condensation at vertical heights, dense line of cumulonimbus clouds develops along the eastern side of the moisture front, causing heavy rain, hail, thunderstorms and lightning.

NEGATIVE IMPACTS OF LINE THUNDERSTORMS

PHYSICAL (NATURAL) ENVIRONMENT	FARMERS	SOCIAL(HUMAN)
• Heavy rainfall cause flash floods that will result in soil erosion	• Heavy rain will erode top soil	• Floods destroy property
• Vegetation will be destroyed by flooding water	• Farmers will lose income as production drops	• Lightning may strike and kill people standing or walking in the open area
• Natural habitats will be destroyed by flood	• Gale force winds will cause early dropping of fruits	• Gale force winds can blow away poorly constructed housing structures
• Food chains and food webs will be destroyed	• Flooding rain will damage ploughed fields	• Hailstones will destroy windows and roof tiles increasing the cost of repair

POSITIVE IMPACT OF THE LINE THUNDERSTORMS

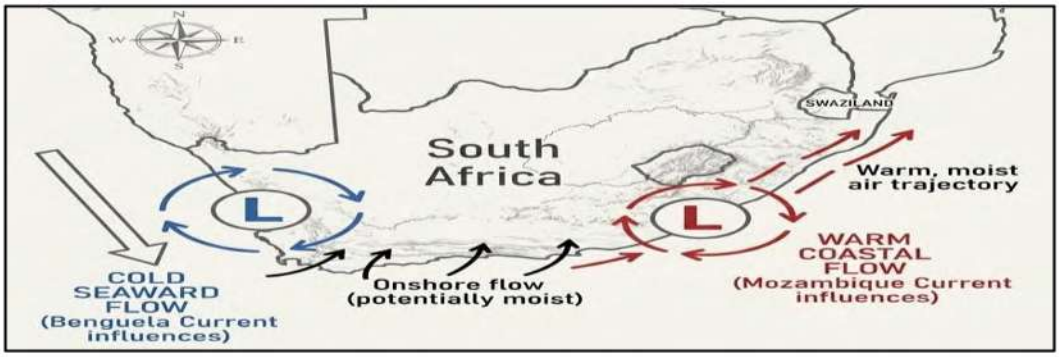
PHYSICAL (NATURAL)	FARMERS	SOCIAL(HUMAN)
• Lightning will fix nitrogen into the ground increasing soil fertility	• Rain will increase water in rivers and dams for irrigation	• Cools the afternoons from the mid-day high summer temperatures
• Wetlands will thrive attracting biodiversity	• Gale force winds will assist in seed dispersal	• Reduce water restrictions in urban areas as water increases in reservoirs

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STRATEGIES TO REDUCE THE NEGATIVE IMPACT OF LINE THUNDERSTORMS

- SAWS should issue a severe storm level alert to people in the interior
- Install lightning conductors to protect against lightning
- Have sandbags to prevent floods
- Outreach programs should be prepared to assist displaced communities during flooding
- Farmers should have a plan to save livestock exposed to storm severity

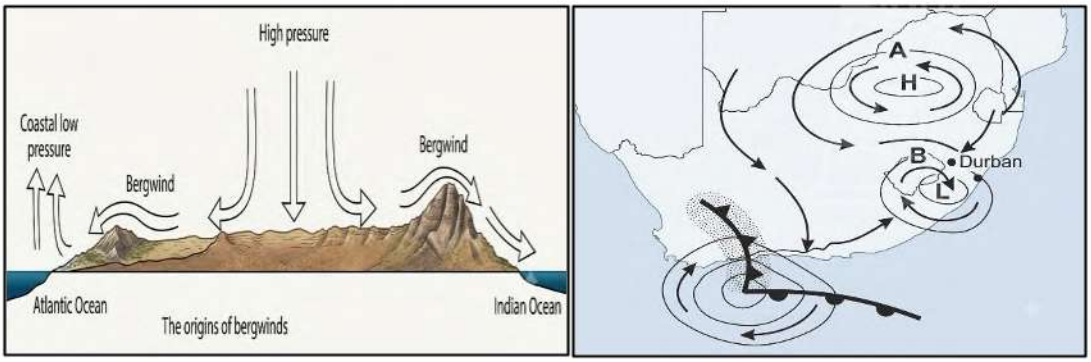
COASTAL LOW



[source: Adapted from Gemini AI]

- The weakly developed, shallow low-pressure system develop because of the convergence of the cool SW onshore winds from the south Atlantic anticyclone(high) and hot offshore NE winds from the Kalahari anticyclones
- Forms along the west coast, migrates southwards and up the south-east coast of south Africa, dissipate further north-east where the escarpment stops
- Associated with unstable conditions: cloud formation fog/drizzle on the west coast and rainfall on the east coast.

BERGWINDS



[Source: https://www.bergwinds#01.co.za]

- Berg winds are hot, dry winds from the interior plateau to the coast.

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- Occur during winter season, when Kalahari high is dominant over the interior and in corresponding position with the coastal low pressure or there is an approaching mid-latitude cyclone
- A pressure gradient causes air to blow from the Kalahari high pressure to the coastal low down the escarpment
- As the air descends it is compressed and heat up adiabatically or 1^0 C/100m
- Adiabatic heating evaporated the little moisture content in the offshore winds making them dry.
- Berg wind condition stops after the passing of the cold front which causes the PG equilibrium

Negative impacts of berg winds

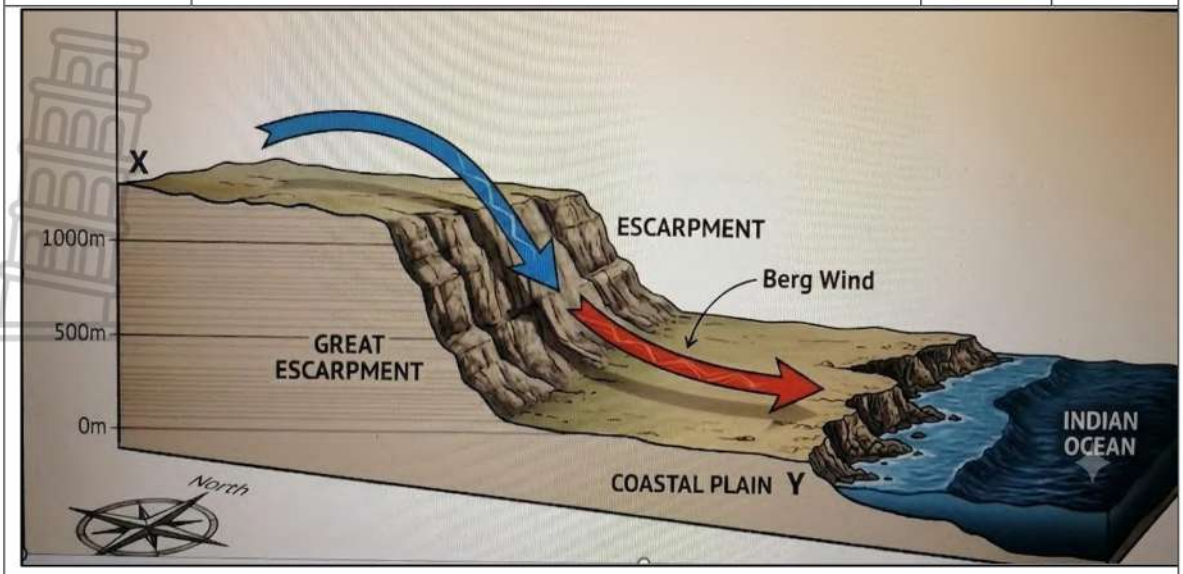
SOCIO-ECONOMIC	PHYSICAL (ENVIRONMENTAL)
• Dehydration during high temperature can lead to death	• Veld fires could burn the dry vegetation
• Loss of farmhouses, equipment and livestock	• Veld fires will burn natural habitats
• Increases insurance claims after veld fires had burnt property	• Veld fires disrupt food chains and food webs
• Lead to flue as temperatures increase and drop sharply	• Veld fires can destroy biodiversity of coastal areas

PRECAUTIONARY MEASURES AND MANAGEMENT

- SAWS should track the berg wind condition and issue early fire and heat wave alert warning
- Farmers should use sprinklers to water large hectares of dry fields to prevent them from veld fires
- Farmers should create a fire break between forests
- Construct outlook towers to monitor and track fires at the edge of the fields or forests
- Keep water tanks and fire extinguishers ready

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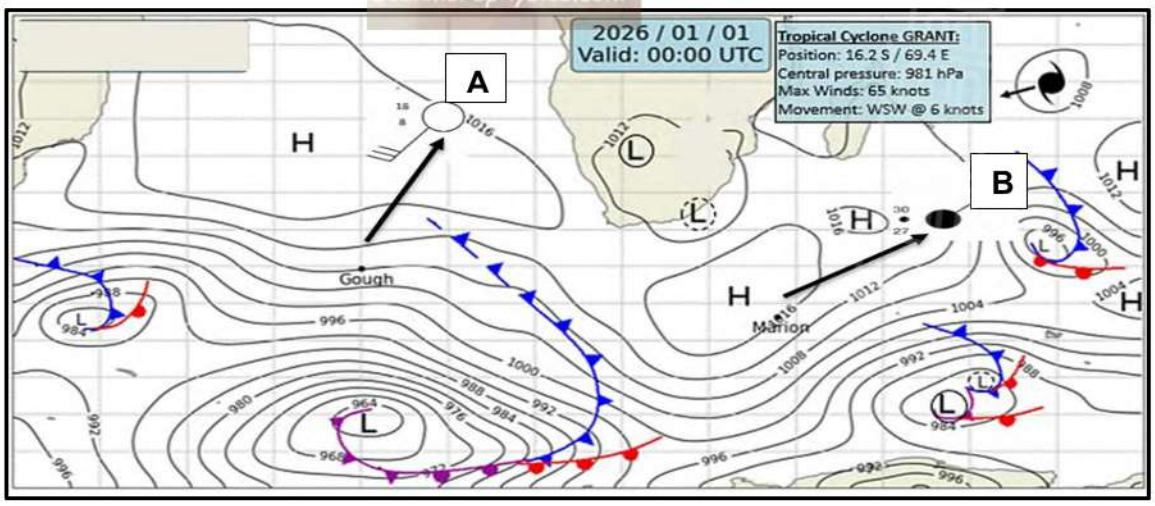
1.6	Refer to the diagram showing berg winds.		



[Source: Adapted from Gemini AI]]

1.6.1	Define the concept *berg winds*	(1 x 2)	(2)
1.6.2	Does berg winds occur in (summer/ winter)?	(1 x 1)	(1)
1.6.3	Account for berg winds being hot and dry.	(2 x 2)	(4)
1.6.4	Outline the negative economic impact of berg winds.	(1 x 2)	(2)
1.6.5	In a paragraph of approximately EIGHT lines, explain strategies that can be implemented to minimise negative impacts of berg winds.	(4 x 2)	(8)

1.7 Study the south African synoptic weather map.



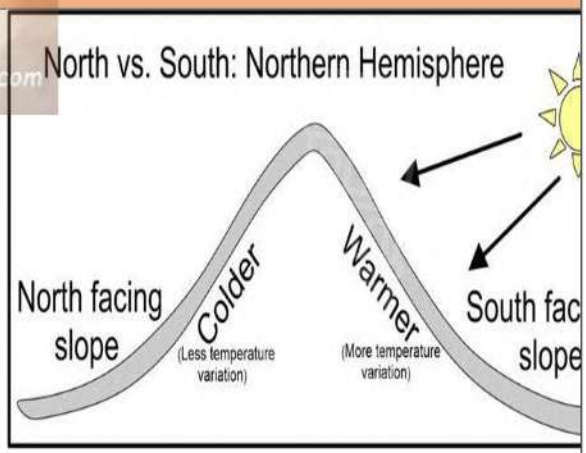
[Source: https://www.saws.co.za]

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1.7.1	The above synoptic weather indicates (winter/summer) season.	(1 x 1)	(1)
1.7.2	An elongation of isobars from the low pressure (LP) is called (ridge / trough)	(1 x 1)	(1)
1.7.3	What is the difference between a ridge and a trough.	(1 x 2)	(2)
1.7.4	Which weather station **A** or **B** has warm and moist air content.	(1 x 1)	(1)
1.7.5	Explain your answer in QUESTION 1.7.4	(1 x 2)	(2)
1.7.6	Account for the temperature differences between weather station **A** and **B**	(2 x 2)	(4)
1.1.7	Discuss the influence of the South Atlantic high and the south Indian high on the development of the line thunderstorm.	(2 x 2)	(4)

SLOPE ASPECT

- **Definition**: The direction in which a slope faces in relation to the sun.
- **Southern Hemisphere**: North-facing slopes face the equator, receive direct sunlight, and are warmer and drier. South-facing slopes face the pole, receive oblique (indirect) sunlight, and are cooler and moister.
- **Northern Hemisphere**: South-facing slopes are warmer; north-facing slopes are cooler.

SOUTHERN HEMISPHERE	NORTHERN HEMISPHERE
	

[Source: https://link.springer.com/article/10.1007/s12665-024-11532-2]

VALLEY WINDS

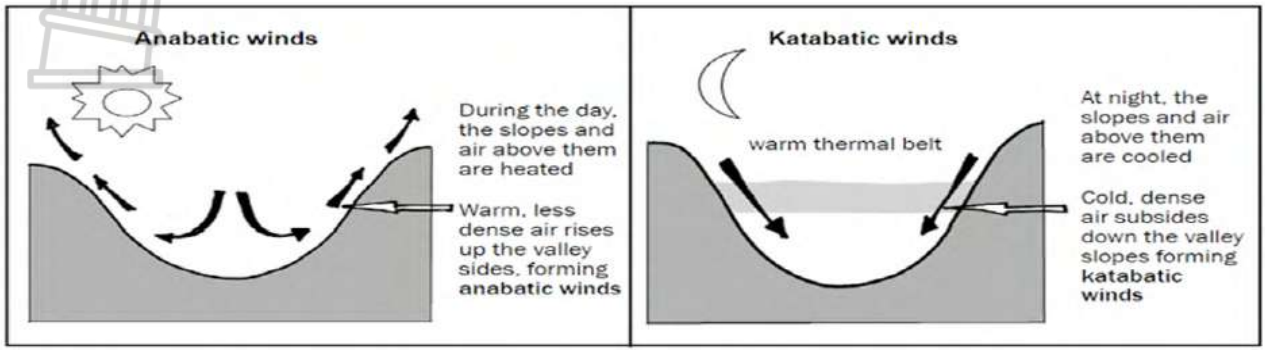
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Anabatic Winds (Up-slope)

- Slopes heat up during the day through insolation.
- Warm, light air rises up the sides of the valley.

Katabatic Winds (Down-slope):

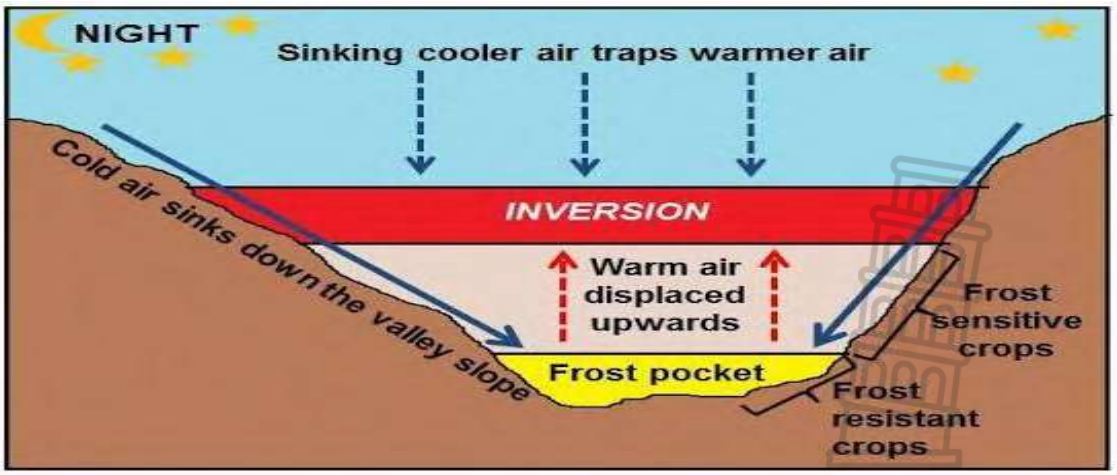
- Slopes cool rapidly at night due to terrestrial radiation.
- Cold, dense air sinks down into the valley floor.



[Source: : Geography-Grade-12-Term-1-Week-4_2021-1.pdf]

Temperature Inversions and Thermal Belts

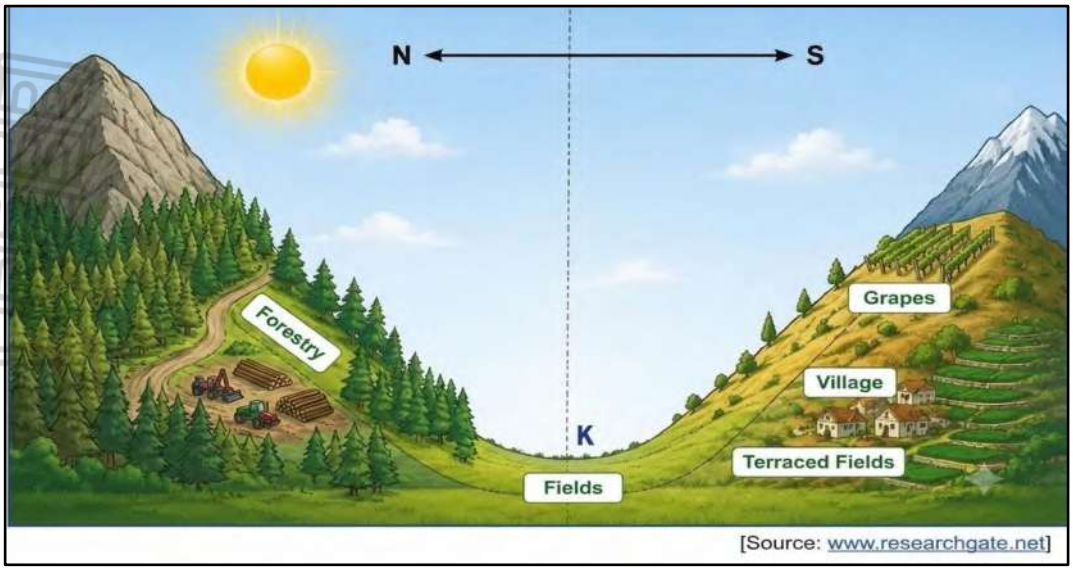
- **Radiation fog**: Cold air sinking at night accumulates on the valley floor, pushing warmer air upward.
- **Thermal Belt**: A mid-slope zone where temperatures are warmer than at the valley bottom.
- **Frost Pocket**: The cold pool of dense air settling at the very bottom of the valley, causing sub-zero temperatures.



[Source: Geography-Grade-12-Term-1-Week-4_2021-1.pdf]

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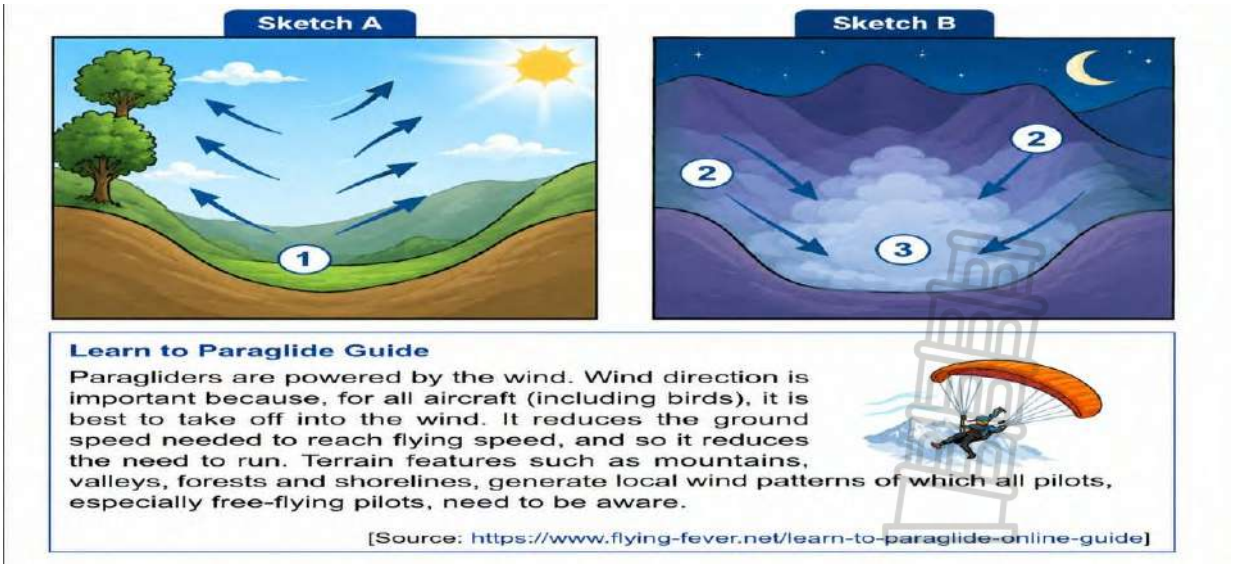
1.8. Refer to the sketch below, which illustrates the diagram of the south- and north-facing slopes.



1.8.1	Define the concept *slope aspect*.	(1 x 2)	(2)
1.8.2	Which hemisphere does the diagram represent?	(1 x 1)	(1)
1.8.3	Give a reason for your answer in QUESTION 1.8.2.	(1 x 2)	(2)
1.8.4	Account for the location of the village in the diagram.	(2 x 2)	(4)
1.8.5	In a paragraph of approximately EIGHT lines, discuss why area **K** is not ideal for settlements.	(4 x 2)	(8)

Study the infographic below on valley climates.

1.9



1.9.1	Name the winds labelled **1** and **2** respectively.	(2 x 1)	(2)
1.9.2	a) (**1/2**) are best for paragliders when taking off from a hill.	(1 x 1)	(1)
	b) Give a reason for your answer to QUESTION 1.9.2a).	(1 x 2)	(2)
1.9.3	What evidence shows that Sketch **B** takes place at night?	(1 x 1)	(1)

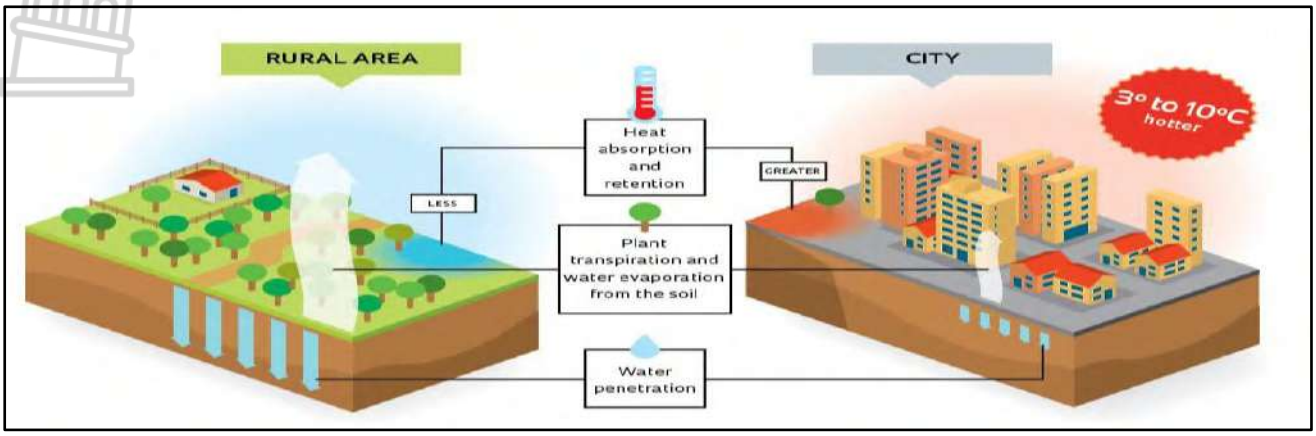
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1.9.4 Why is area **3** not suitable for cultivation of all types of crops? (1 x 2) (2)

1.9.5 What causes poor visibility on the valley floor in sketch **B** during winter mornings? (1 x 1) (1)

1.9.6 Explain the formation of radiation fog. (3 x 2) (6)

DIFFERENCES BETWEEN RURAL AND URBAN CLIMATES



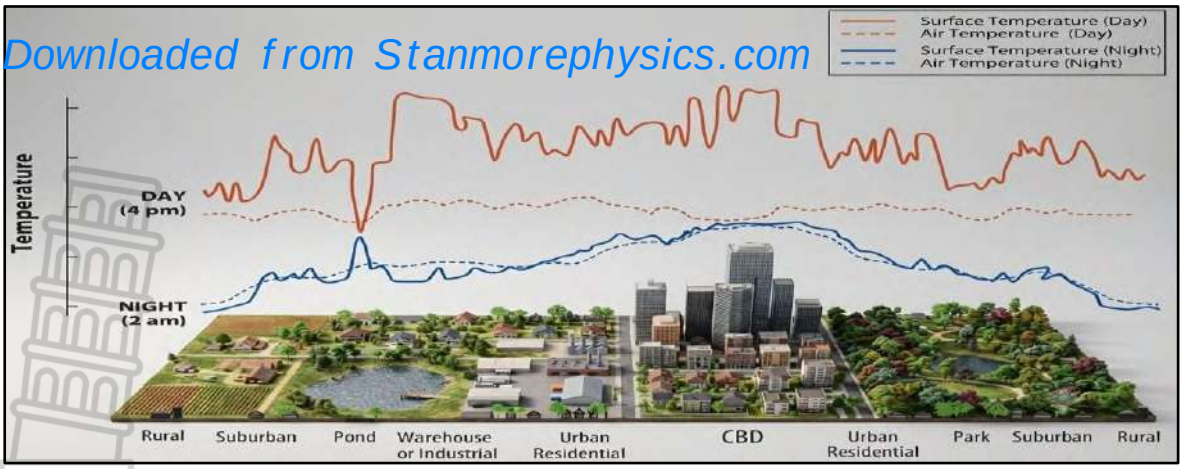
[Source: https://www.csir.co.za/sites/default/files/urban%20heat.png

WEATHER CONDITIONS	RURAL	URBAN
1. Cloud cover	**Less** due to less pollutants that act as condensation nuclei.	**More** due to more pollutants from factories and cars etc. producing condensation nuclei.
2. Precipitation	**Less rainfall** due to less cloud cover.	**More rainfall** due to more cloud cover.
3. Humidity	**More** relative humidity as a result of more vegetation cover and water bodies leading to high evaporation rate.	**Less** relative humidity due to more drainage system channeling water away from the city and lack of vegetation.
4. Wind Speed	**Higher** due to more open spaces.	**Less** due to tall buildings acting as windbreaks.
5. Temperature	**Cooler** temperatures as a result of more natural cooling effects and fewer artificial surfaces.	**Higher** temperatures due to more artificial heating, more artificial surfaces, lack of vegetation and more greenhouse gases.
Urban heat island		

Urban Heat Island – Higher temperatures in the city surrounded by lower temperatures in the rural.

Isotherms – Lines on a map joining places of equal temperature.

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[Source: Gemini AI]

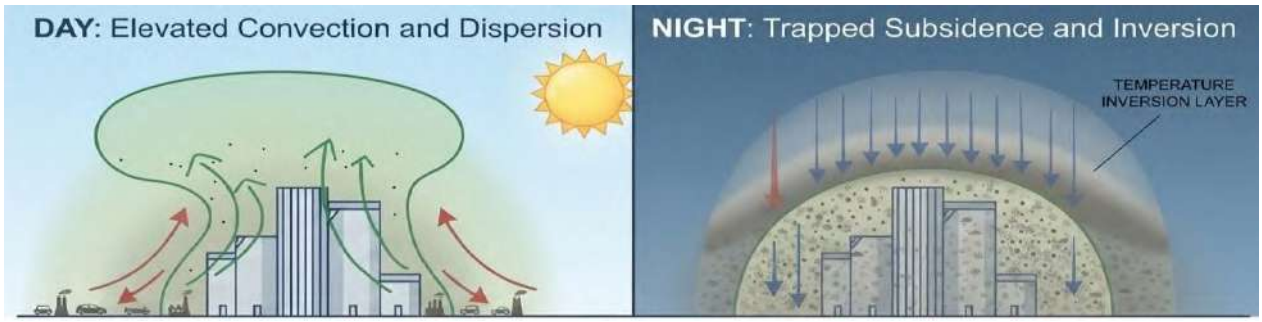
CAUSES OF URBAN HEAT ISLANDS

- Artificial surfaces like glass, iron, stone, brick absorbs more heat.
- Dark colour paints absorb more heat
- Production of artificial heat e.g. Air conditioners and engines from vehicles

POLLUTION DOME

Pollution dome – Mass concentration of pollutants trapped above the city.

DAY **NIGHT**



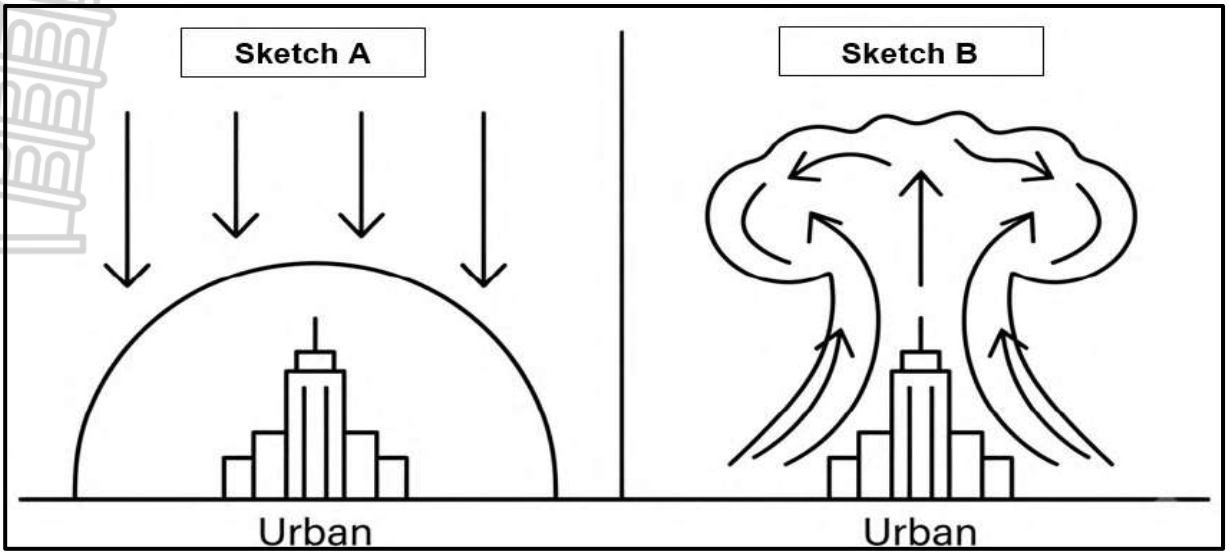
[source: Gemini AI]

• More vertical in dimension • Strong updrafts • Strong convection currents • More carbon activities e.g. Cars	• Dome shaped • Strong subsiding cold air • Weak convection currents • Pollutants trapped and concentrated above the city

CAUSES	EFFECTS	SOLUTIONS
• Emissions from vehicles – carbon monoxide and nitrogen oxide • Burning of fossil fuels – carbon dioxide • Industrial activities emitting high amounts of pollution	• Smog and fog • Visibility reduced • Acid rain • Respiratory problems • Global warming • Heat strokes	• Plant trees • Rooftop gardens • Use reflective paints • Commercial decentralisation

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1.10 Refer to sketches **A** and **B** on pollution dome. Choose the correct letter of the sketch that matches the description below. Write only **A** or **B** next to the question number. e.g. 1.10.7 B



[Source: examiner's sketch]

1.10.1 Depicts night condition.

1.10.2 Weak convection currents.

1.10.3 Warm air pushes pollutants to greater heights.

1.10.4 Associated with the presence of high pressure at night.

1.10.5 Results in the formation of acid rain.

1.10.6 Inversion layer is found in higher altitudes.

(6 x 1) (6)

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1.11 Refer to the extract on urban heat island.

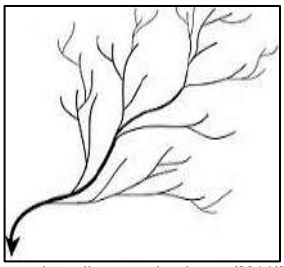
Urban heat islands: measured, mapped and managed

One major factor is the dense clustering of tall buildings which can block and redirect natural wind flows, reducing ventilation in city centers. Narrow streets and urban canyons can trap hot air, causing it to stagnate and intensify the feeling of heat at street level. Another key driver is the prevalence of heat-absorbing materials like asphalt, concrete, and brick. These surfaces soak up solar energy throughout the day, holding onto that warmth well into the night. As a result, urban areas can remain hot even after sunset, prolonging discomfort and increasing demand for cooling (which increases energy consumption in turn).

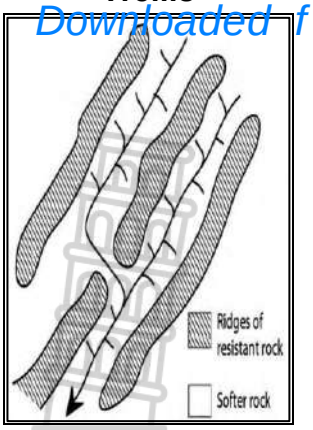
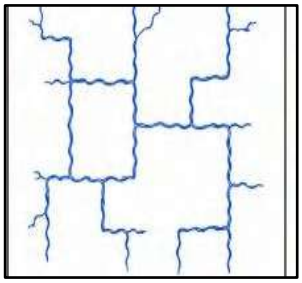
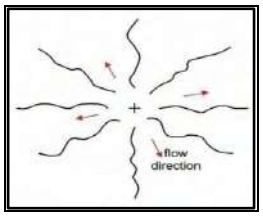
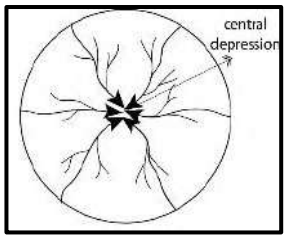
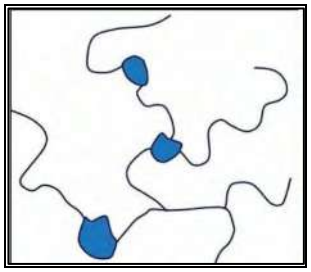
Cities also reduce the land's natural ability to cool itself through evaporation. Paved surfaces and impervious ground prevent rainwater from being absorbed by the soil, depriving the environment of moisture that would normally evaporate and carry heat away. This missing process, called evaporative cooling, makes urban areas warmer and drier than surrounding landscapes.

[source:https://land.copernicus.eu/en/feature-articles/urban-heat-islands-measured-mapped-and-managed]

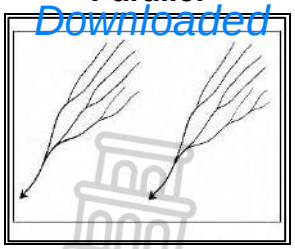
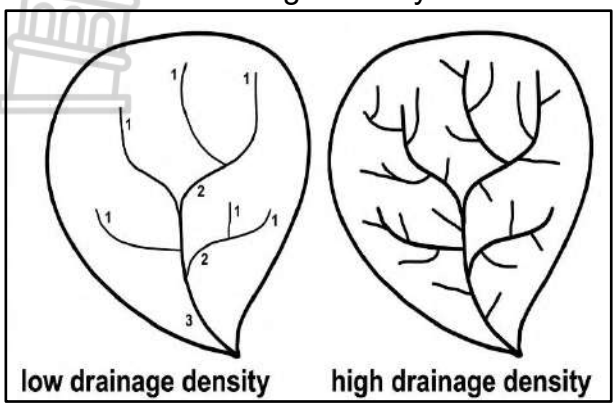
1.11.1	Define the concept *Urban Heat Island*.	(1 x 2)	(2)
1.11.2	According to the extract, give ONE material that greatly absorbs heat.	(1 x 1)	(1)
1.11.3	Explain why the land's natural ability to cool itself is reduced in cities.	(2 x 2)	(4)
1.11.4	In a paragraph of approximately EIGHT lines, suggest sustainable strategies that could be implemented by city planners in minimizing the urban heat island effect.	(4 x 2)	(8)

DRAINAGE PATTERNS			
Pattern	**Description**	**Underlying rock Structure**	**Rock Type**
Dendritic  [Source:https://www.geologyin.com/2014/03/drainage-pattern.html?m=1]	- Tributaries join the main stream at acute angles. - Tributaries resemble the branches of a tree	- A rock with a uniform resistance to erosion. - Horizontal sedimentary rock	- Massive Igneous - Sedimentary Rocks

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Trellis  [Source:https://www.geologyin.com/2014/03/drainage-pattern.html?m=1]	- Main streams are parallel to each other with short tributaries joining the main stream at right angles/90°	- Folded rock of hard and soft rock - Alternate layers of hard and soft rock - A rock with a varying resistance to erosion	- Igneous - Sedimentary
Rectangular  [Source: Examiner's own sketch]	- The main stream takes bends of 90° or right angles along its course - Tributaries join the main stream at right angles or 90°	- Underlying rock has many joints and faults	- Fragmented / jointed Igneous
Radial  [Source:https://www.geologyin.com/2014/03/drainage-pattern.html?m=1]	- Rivers flow outwards away from a central high point. - Resembles the spoke of a wheel	- Massive igneous rock that forms a dome	- Massive igneous (dome)
Pattern	**Description**	**Underlying rock Structure**	**Rock Type**
Centripetal  [Source:https://www.geologyin.com/2014/03/drainage-pattern.html?m=1]	- Rivers flow in towards a central low point	- Massive igneous rock that forms a basin, depression or lake	- Massive igneous rocks
Deranged  [Source:https://www.geologyin.com/2014/03/drainage-pattern.html?m=1]	- Has an irregular pattern - Has many lakes and swamps	- Forms in very flat areas that recently formed	

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Parallel  [Source:https://www.geologyin.com/2014/03/drainage-pattern.html?m=1]	- Tributaries are long and parallel to each other and to the mainstream	- Occurs in very steep folded rock - Occurs in areas with major faults	- Sedimentary
Drainage density  [Source: https://m.youtube.com/watch?v=Ah2l5rb6cGI&rq+m]	The measure of total length of streams per unit area. • A drainage density can be described as low, medium, and high density.		

FACTOR	HIGH DRAINAGE DENSITY	LOW DRAINAGE DENSITY
Precipitation	An increase in precipitation results in high run-off.	A decrease in precipitation (such as in an arid environment) results in lower drainage density.
Soil Moisture	Soil with high moisture will result in low infiltration and high run-off.	Soil with little moisture will result in high infiltration and fewer streams.
Vegetation Cover	Areas with little vegetation cover will have little infiltration and high run-off.	Areas with high vegetation cover will have high infiltration and fewer streams.
Slope / Gradient	Steep slopes will promote high run-off and less infiltration.	Gentle slopes will promote high infiltration and fewer streams.
Porosity & Permeability	Low porosity and low permeability will lead to high run-off.	High porosity and high permeability will lead to high infiltration and fewer streams.
Evaporation Rate	Low evaporation rate will lead to high number of streams.	High evaporation rate will lead to a lower number of streams.

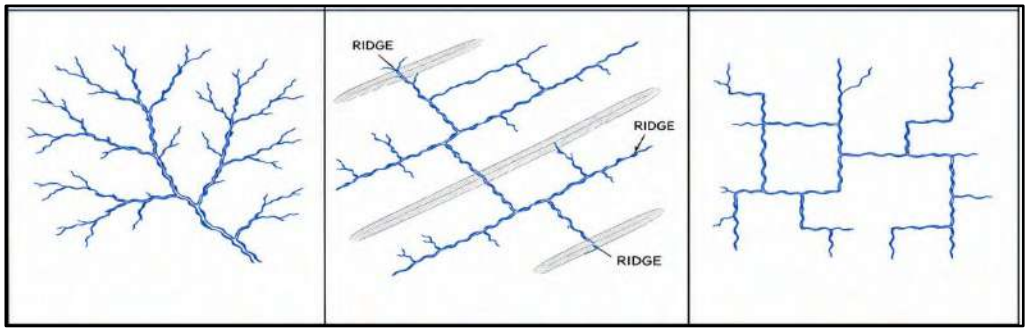
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2.1 Complete the statements in COLUMN A with the options in COLUMN B. Write only Y or Z next to the question numbers (2.1.1 to 2.1.8) in the ANSWER BOOK, e.g. 2.1.9 Y

2.1.1	An area drained by the river and its tributaries.	**Y.** Drainage basin **Z.** Catchment area	
2.1.2	A point where two rivers meet.	**Y.** Confluence **Z.** Tributary	
2.1.3	High lying area that separates two drainage basins.	**Y.** Interfluve **Z.** Watershed	
2.1.4	A starting point of a river.	**Y.** River source **Z.** River mouth	
2.1.5	Process whereby water from the ground enters the soil.	**Y.** Surface run-off **Z.** Infiltration	
2.1.6	Upper limit of saturated zone.	**Y.** Groundwater **Z.** Water table	
2.1.7	River that flows throughout the year.	**Y.** Permanent **Z.** Exotic	
2.1.8	A temporary stream that flows only after heavy rainfall.	**Y.** Periodic **Z.** Episodic	
		(8 x 1)	(8)

2.2 Refer to the sketches **A**, **B** and **C** below showing drainage patterns.

A **B** **C**



[Source: Examiner's own sketch]

2.2.1	Identify drainage pattens **A**, **B** and **C** above.	(3 x 1)	(3)
2.2.2	Give a reason for pattern **A** and **B** in QUESTION 2.2.1.	(2 x 2)	(4)
2.2.3	Which drainage pattern is more suitable for farming?	(1 x 1)	(1)
2.2.4	Give a reason for your answer to Question 2.2.3 above.	(1 x 2)	(2)
2.2.5	Describe the underlying rock structure of drainage pattern **A** and **B**.	(2 x 2)	(4)

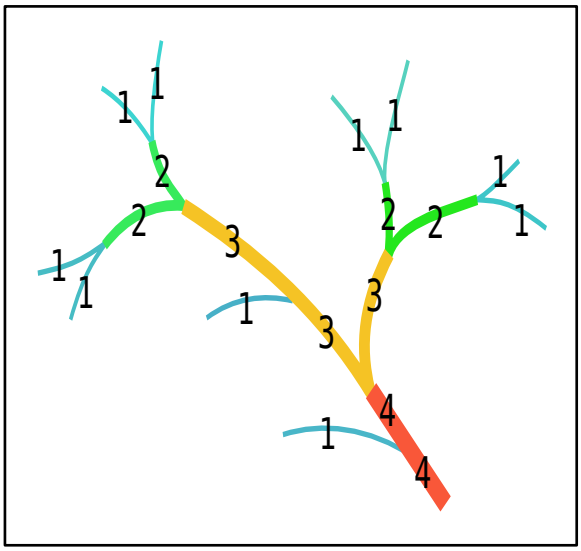
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DETERMINING STREAM ORDER

Stream order is a method used to classify streams in a drainage basin according to their position in the drainage network.

Strahler stream ordering rules

1. Streams with no tributaries are first-order streams.
2. When two streams of the same order join, the order increases by one.
3. When streams of different orders join, the higher order continues downstream.



[Source: by Kilom.com]



Higher-order streams generally have a larger drainage basin, greater discharge, a wider channel, and a gentler gradient than lower-order streams.

DISCHARGE OF A RIVER

River discharge is the volume of water flowing past a fixed point in a river per second.

It is measured in cubic meters per second (m^3/s).

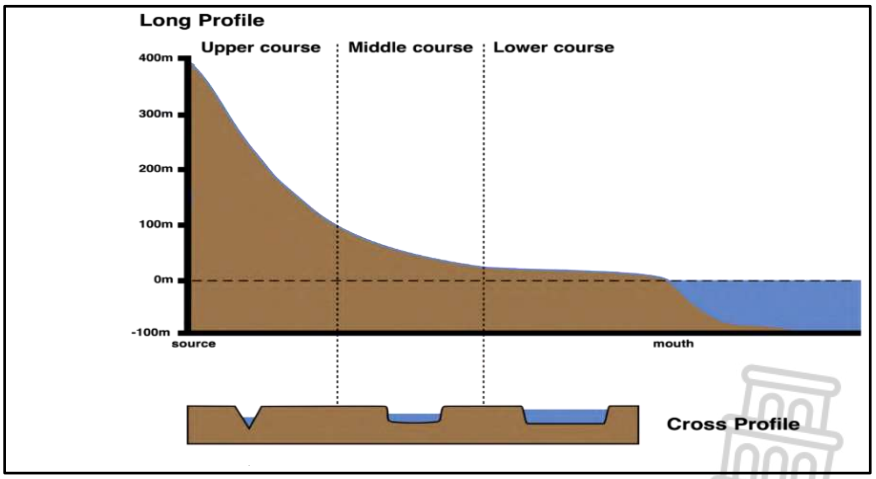
FACTORS AFFECTING DISCHARGE

FACTOR	EFFECT
Heavy rainfall	Excess water flows over the surface into streams and rivers. This increases river discharge, raises the water level quickly, and can lead to flooding.
Steep slopes	There is less time for infiltration into the soil, so more water reaches the river quickly as surface runoff.
Impermeable rock	If infiltration is limited, groundwater recharge is reduced, and a greater proportion of rainfall becomes surface runoff.
Urban areas	This creates high surface runoff, increases discharge quickly, shortens the lag time, and increases the risk of flash floods.
Dense vegetation	Reduces surface runoff, lowers the flood peak, and results in a more gradual increase in river discharge.

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LAMINAR AND TURBULENT FLOW	
Laminar flow is the smooth movement of water in parallel layers with very little mixing between the layers. It usually occurs where the river has a relatively gentle gradient and lower velocity. It is associated with dark water since rocks have dissolved and are suspended in water.	 *[Source:https://simwiki.com]*
Turbulent flow is the irregular and chaotic movement of water with strong mixing, eddies, and whirlpools. It is associated with higher velocity, rough river beds, and obstacles such as rocks. Associated with white water, rock have not dissolved in water.	 *[Source:https://simwiki.com]*

2.3 Refer to FIGURE 2.3 below showing river profiles.



[Source: www.internetgeography.net]

2.3.1 Define the concept *longitudinal profile*. (1 x 2) (2)

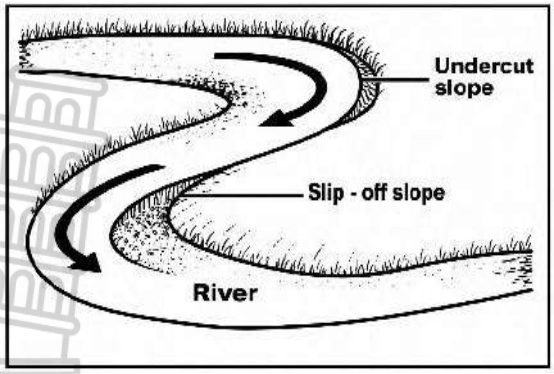
2.3.2 Name TWO dominant geomorphological (fluvial) processes occurring in the middle course of a river. (2 x 1) (2)

2.3.3 Describe the relationship between the size of the load and the distance downstream from the source. (1 x 2) (2)

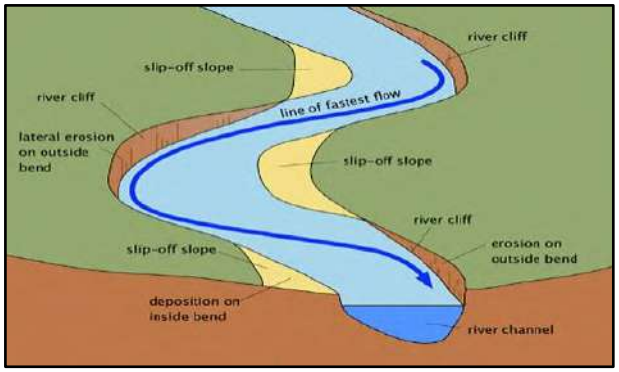
2.3.4 Explain why deposition becomes the dominant process in the lower course of a river. (3 x 2) (6)

Development of meanders

Downloaded from Stanmorephysics.com



[Source: handbook for learners]



[Source: www.internetgeography.net]

Two slopes with different characteristics develop at the meander loop.

Undercut slope

This slope develops at the outer bank.

Characteristics:

- The slope is concave.
- The river flows fast at this side.
- Erosion, especially undercutting occur
- The area is deep.

Slip-off slope

This slope develops at the inner bank.

Characteristics:

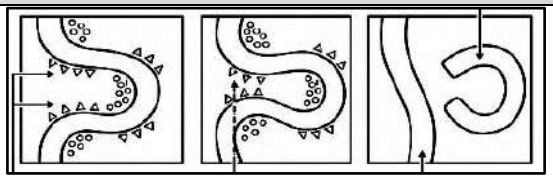
- This slope is convex.
- The river flows slow at this side.
- Deposition occurs.
- The slope is shallow

SIGNIFICANCE

Meanders create fertile floodplains because rivers deposit nutrient-rich alluvium. They provide habitats for plants and animals, attract tourists because of their aesthetic beauty, and are important for farming. Meanders also demonstrate how rivers shape landscapes over time.

POSITIVE IMPACTS	NEGATIVE IMPACTS
• Fertile agricultural land. • Beautiful landscapes that attract tourists. • Support biodiversity. • Improve groundwater recharge.	• Riverbank erosion can damage farmland and buildings. • Roads and bridges near rivers may be damaged.

OXBOW LAKE



[Source: https://tithebarn.wordpress.com]

An oxbow lake is a crescent-shaped lake that forms when a river meander loop is cut off from the main river channel.

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[Source: https://www.google.com]

- The erosion on the outer-bank and the deposition in the inner-bank.
- Closing the original path with deposition in inner bank and create new path with erosion in outer bank.
- Continuously eroding and depositing will narrow the meander neck.
- Eventually the meander loop is cut off from the rest of river.
- Forming an oxbow lake.

CHARACTERISTICS

- It has a distinctive horseshoe or crescent shape.
- It is found mainly in the lower course of a river.
- If enough sediment accumulates, the oxbow lake may eventually dry up and form a meander scar.

POSITIVE IMPACTS	NEGATIVE IMPACTS
• Support biodiversity and wetland ecosystems. • Attract tourists for birdwatching, fishing, and photography. • Supply water for livestock and, in some areas, irrigation. • Improve the natural beauty of the landscape.	• Can become breeding grounds for mosquitoes and water-borne diseases. • May become polluted by agricultural runoff or waste. • Gradually fill with sediments and vegetation, causing them to dry up. • Flooding around oxbow lakes can damage nearby farmland and infrastructure.

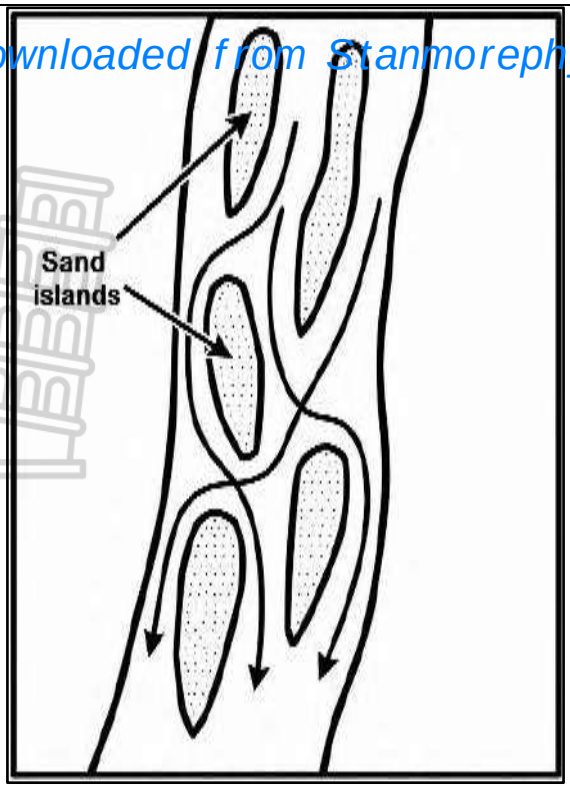
BRAIDED STREAMS



[Source: https://adisclasses.in]

A river that is divided into two or more interconnected channels by sandbars, gravel bars or small islands of deposited sediment. These channels repeatedly split and re-join, giving the river a braided appearance.

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[Source: https://geography-revision.co.uk]

FORMATION

Forms when a river carries more sediment than it can transport. As the river loses energy, it begins to deposit sand, gravel and other sediments on the river bed. These deposits form sandbars and gravel bars, which divide the flow of water into several smaller channels (distributaries). During periods of heavy rainfall or snowmelt, the river may have enough energy to move some of the sediment, but when the water level drops, more sediment is deposited again. This continuous process of erosion, transportation and deposition causes the channels to separate and re-join, creating the braided pattern.

CHARACTERISTICS

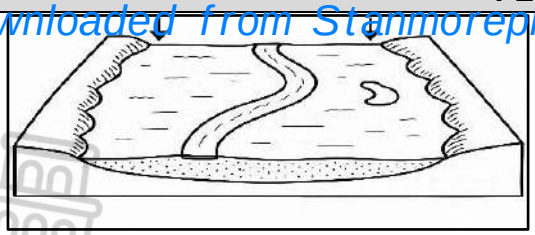
- The river consists of many shallow channels instead of one main channel.
- Channels are separated by sandbars, gravel bars or small islands.
- The channels frequently divide and join together.
- The river has a wide and shallow channel.
- Large amounts of coarse sediment are deposited on the river bed.
- The position of the channels changes regularly after floods

IMPACTS OF BRAIDED STREAMS

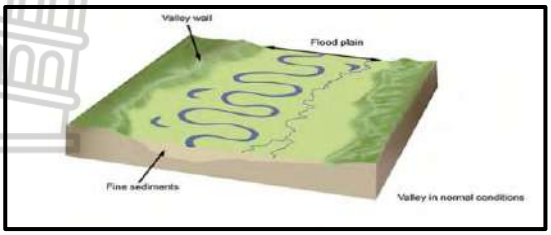
POSITIVE IMPACTS	NEGATIVE IMPACTS
• Create habitats for many plants and animals' species. • Supply sand and gravel for the construction industry. • Recharge groundwater in surrounding areas. • Help transport sediments to lower parts of the river system. • Provide opportunities for tourism, recreation and scientific research.	• Channels change position frequently, making bridges and roads vulnerable to damage. • High sediment loads can increase the risk of flooding. • Braided rivers are difficult to navigate because of shallow water and shifting channels. • Agricultural land may be covered by deposited sediment after floods. Riverbank erosion can damage nearby infrastructure and farmland.

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FLOOD PLAIN



[Source: https://www.google.com/]



[Source: https://mammothmemory.net/

A floodplain is a wide, flat area of land found on both banks (sides) of a river.

FORMATION

It is formed when a river overflows its banks during floods and deposits layers of alluvium (fine fertile sediment) over many years.

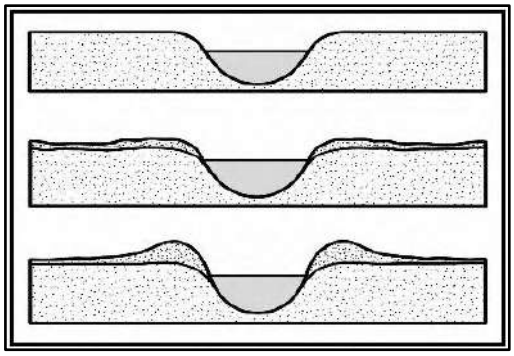
CHARACTERISTICS

- Wide, flat and gently sloping land.
- Found alongside rivers.
- Consists of fertile alluvial soil.
- Frequently flooded during heavy rainfall.
- Often contains meanders, oxbow lakes and natural levees.

IMPACT OF FLOOD PLAINS

POSITIVE IMPACTS	NEGATIVE IMPACTS
• Fertile soils increase agricultural production. • Reliable water supply for farming. • Supports biodiversity and wetland ecosystems. • Attractive areas for tourism and recreation. • Flood deposits add nutrients to the soil.	• High risk of flooding. • Damage to homes, roads and bridges. • Loss of crops and livestock during floods. • Soil erosion after severe flooding. • Settlements on floodplains are vulnerable to flood disasters.

NATURAL LEVEES



[Source: https://www.internetgeography.net/]

A raised banks (embankment) of sand, silt and other sediments that forms naturally along the river after repeated flooding.

FORMATION

Natural levees are formed by the deposition of coarse sediments when floodwaters overflow the river banks and lose energy repeatedly.

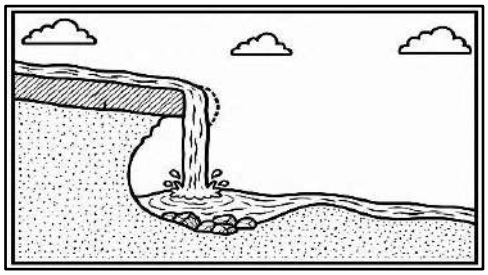
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	CHARACTERISTICS
 [Source: https://www.tes.com/]	• Raised ridges found on both sides of a river channel. • Made up mainly of coarse sediments such as sand and gravel. • Form naturally through repeated flooding. • Separate the river channel from the floodplain. • Usually found in the lower course of rivers.

IMPACTS OF NATURAL LEVEES

POSITIVE IMPACTS	NEGATIVE IMPACTS
• Help protect surrounding land from minor flooding. • Reduce soil erosion along river banks. Support farming because nearby soils are fertile. • Can provide suitable sites for roads and settlements because they are slightly higher than the surrounding floodplain. • Improve natural drainage in some areas	• They may be overtopped or breached during severe floods. • When a levee breaks, flooding can be sudden and destructive. • Floodwaters trapped behind levees may take longer to drain. • Settlements built behind levees remain at risk if the levee fails. • Maintenance may be needed where natural levees have been modified by people.

WATERFALL

 [Source: https://getrevising.co.uk/]	A vertical or near-vertical drop in the course of a river where water flows over a steep cliff or rock face.

FORMATION

Waterfalls usually form where hard (resistant) rock overlies soft (less resistant) rock.

As the water flows over the hard rock, it erodes the underlying softer rock faster

Have a steep or vertical drop.

A plunge pool develops at the base of the waterfall.

The waterfall retreats upstream over time due to erosion.

A gorge is often left behind as the waterfall retreats.

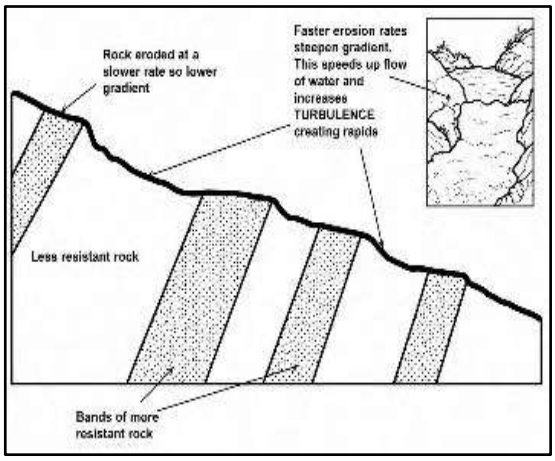
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CHARACTERISTICS OF WATERFALLS

- Form where hard rock overlies soft rock.
- Have a steep or vertical drop.
- A plunge pool develops at the base of the waterfall.
- The waterfall retreats upstream over time due to erosion.
- A gorge is often left behind as the waterfall retreats.

POSITIVE IMPACTS	NEGATIVE IMPACTS
• Attract tourists, creating jobs and income. • Suitable sites for hydroelectric power generation. • Enhance the natural beauty of landscapes. • Support biodiversity by providing habitats for specialized species. • Encourage conservation and environmental awareness.	• Waterfalls can be dangerous due to strong currents and slippery rocks. • Continuous erosion may threaten nearby roads, bridges and infrastructure. • Flooding can increase the force of water, causing damage downstream. • Large numbers of tourists may cause environmental degradation if not properly managed. • Construction of dams for hydroelectric power may alter the natural river environment.

RAPIDS



[Source: https://www.diffen.com/]

Rapids are sections of a river where the water flows very fast and turbulently over a steep, rocky riverbed.

FORMATION

They usually form where the river flows over hard, resistant rock or where there is a sudden change in the river's gradient.

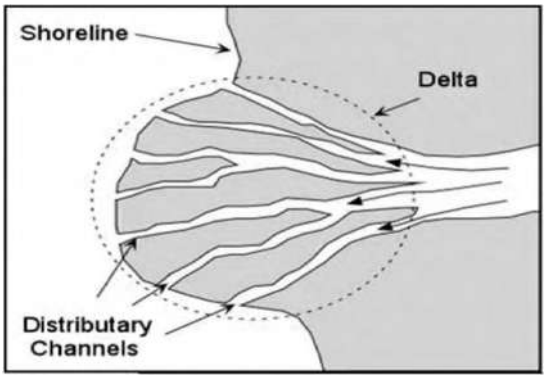
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CHARACTERISTICS OF RAPIDS

- Found mainly in the upper course of a river.
- Water flows rapidly with strong turbulence.
- The riverbed is rocky and uneven.
- Contain shallow water with protruding rocks and boulders.
- Produce white, foamy water due to the fast flow.
- Often occur before or after waterfalls.

POSITIVE IMPACTS	NEGATIVE IMPACTS
• Attract tourists for rafting, kayaking and sightseeing. • Create employment opportunities through tourism. • Increase oxygen levels in the water, supporting aquatic life. • Help shape river channels through erosion. • Enhance the scenic beauty of the landscape.	• Dangerous for boats and river transport. • Pose safety risks to swimmers and tourists. • Can damage boats due to submerged rocks. • Strong currents may cause drowning during floods. • Erosion around rapids may threaten nearby infrastructure.

DELTA



[Source: https://golearngeo.wordpress.com/]

A low-lying depositional landform that forms at the mouth of a river, where the river flows into a sea, lake or ocean.

FORMATION

It develops when the river loses energy and deposits large amounts of sediment. Over time, these sediments build up to form new land, and the river divides into several smaller channels called distributaries.

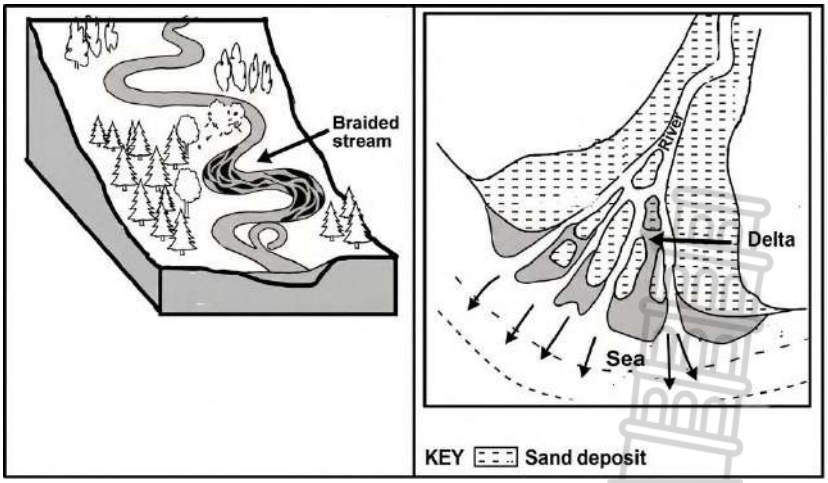
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CHARACTERISTICS OF DELTAS

- Found at the mouth of a river.
- Formed by the deposition of alluvium (sediment).
- Have a flat, low-lying landscape.
- The river divides into distributaries.
- Consist of fertile soils rich in nutrients.
- Continuously grow as more sediment is deposited.

POSITIVE IMPACTS	NEGATIVE IMPACTS
• Fertile soils support high agricultural production. • Rich fishing grounds provide food and employment. • Support biodiversity by providing habitats for birds, fish and other wildlife. • Promote tourism and recreation. • Provide land for settlements and economic development. • Deltas provide water for irrigation, fishing and other economic activities. • Important areas for transport and trade because they are close to the coast.	• Deltas are highly vulnerable to flooding during heavy rainfall and storms. • Sediment build-up can block river channels, affecting navigation. • Pollution from farming and industries can damage delta ecosystems. • Coastal erosion and rising sea levels threaten delta communities. • Overpopulation and urban development can place pressure on natural resources

2.4 Refer to the sketches below of a braided stream and a delta.



[Adapted from https://www.researchgate.net/figure/Basic-environments-of-deltas-aFluvial-]

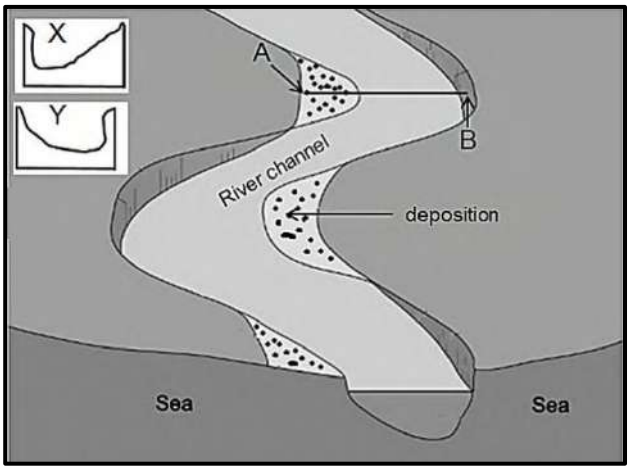
2.4.1 Name the fluvial landform formed where a river enters the sea and deposits its load. (1 x 1) (1)

2.4.2 State TWO conditions that encourage the formation of a braided stream. (2 x 1) (2)

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2.4.3	Explain why a river splits into distributaries in a delta.	(2 x 2)	(4)
2.4.4	Distinguish (differentiate) between a braided stream and a delta.	(2 x 2)	(4)
2.4.5	Farmers often settle on deltas despite the flood risk. Explain TWO advantages of farming on Deltas	(2 x 2)	(4)

2.5 Refer to the sketch below of a fluvial landform.



[Source: https://www.internetgeography.net/flashcard/]

2.5.1	Define the concept *meander*.	(1 x 2)	(2)
2.5.2	Name the landform that is likely to form when the meander loop is cut off.	(1 x 1)	(1)
2.5.3	Explain TWO reasons why deposition occurs on the inner bank.	(2 x 2)	(4)
2.5.4	In a paragraph of approximately EIGHT lines, explain how the landform mentioned in QUESTION 2.5.2 above is formed.	(4 x 2)	(8)

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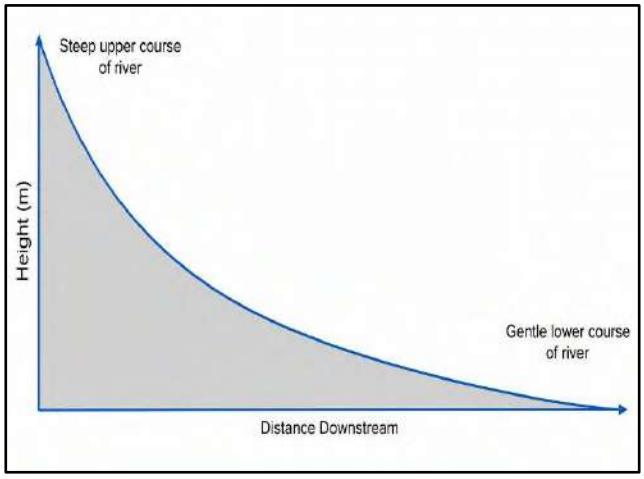
RIVER GRADING

1. GRADED RIVER

Smooth, concave longitudinal profile.

Characteristics

- A river that has reached a state of **equilibrium**, where the **rate of erosion equals the rate of deposition** over a long period.
- No obstacles.
- Erosion and deposition are balanced.



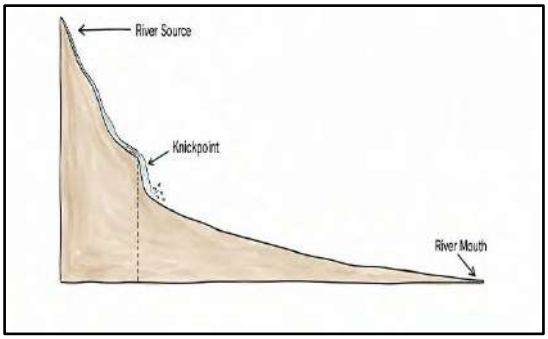
[Source: Examiner's own sketch]

2. UNGRADED RIVER

River with uneven riverbed.

CHARACTERISTICS

- Waterfalls and rapids are present.
- Irregular gradient.
- Vertical erosion dominates.
- Turbulent flow.



[Adapted from:https://m.youtube.com/watch?v=0yl_Ob9uaCc]

3. PROCESSES INVOLVED IN A RIVER BECOMING GRADED

UPPER COURSE

- Vertical (downward) erosion is dominant.
- Headward erosion removes waterfalls and rapids.

MIDDLE COURSE

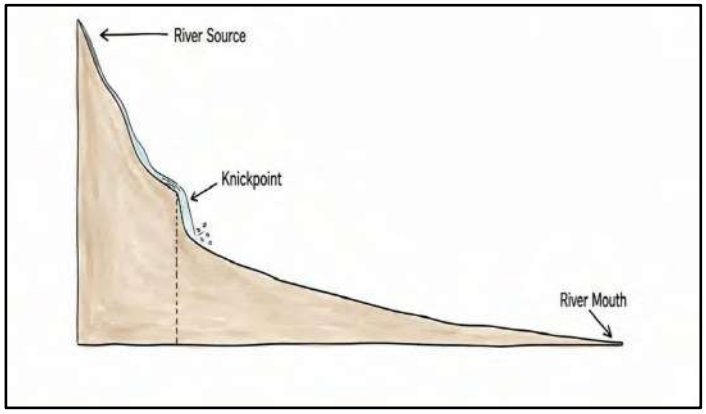
- More lateral erosion occurs.
- River transports larger amounts of sediment.

LOWER COURSE

- Gradient becomes very gentle.
- Deposition increases.
- The river develops a smooth, concave profile.
- Equilibrium is reached

2.6 Refer to FIGURE 2.6 below showing river grading.

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[Source: Examiner's own sketch]

2.6.1 Define the concept *ungraded river.* (2)

2.6.2 Identify ONE temporary base level evident in the sketch. (1)

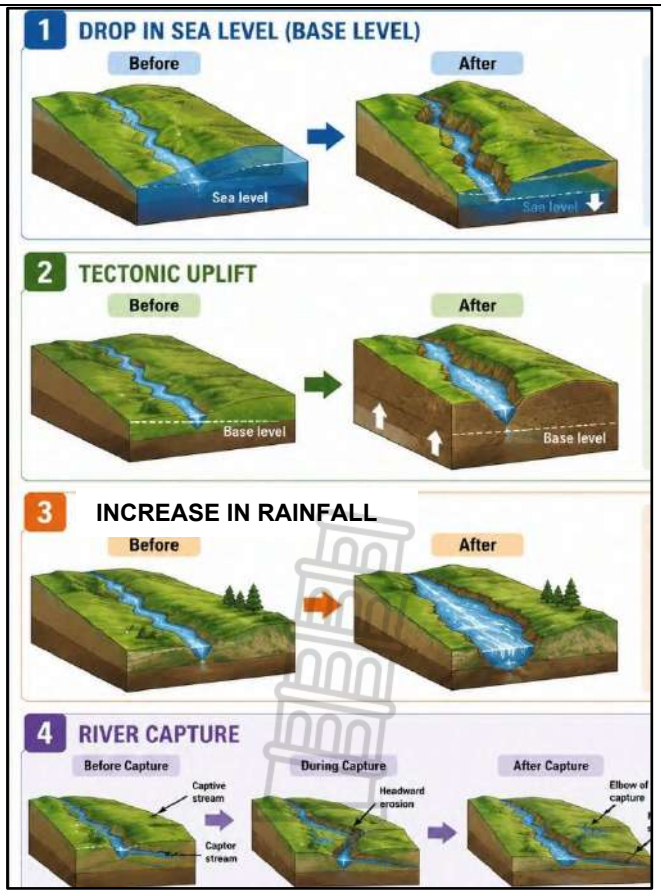
2.6.3 In a paragraph of approximately EIGHT lines, explain how an ungraded river gradually becomes a graded river (4)

DROP IN SEA LEVEL (BASE LEVEL)
When sea level falls, rivers erode downwards to reach the new lower base level.

TECTONIC UPLIFT
The land is raised by earth movements, increasing the river's gradient and erosive power.

INCREASE IN RAINFALL
Increase in rainfall or snowmelt increases the volume and speed of the river, leading to stronger erosion.

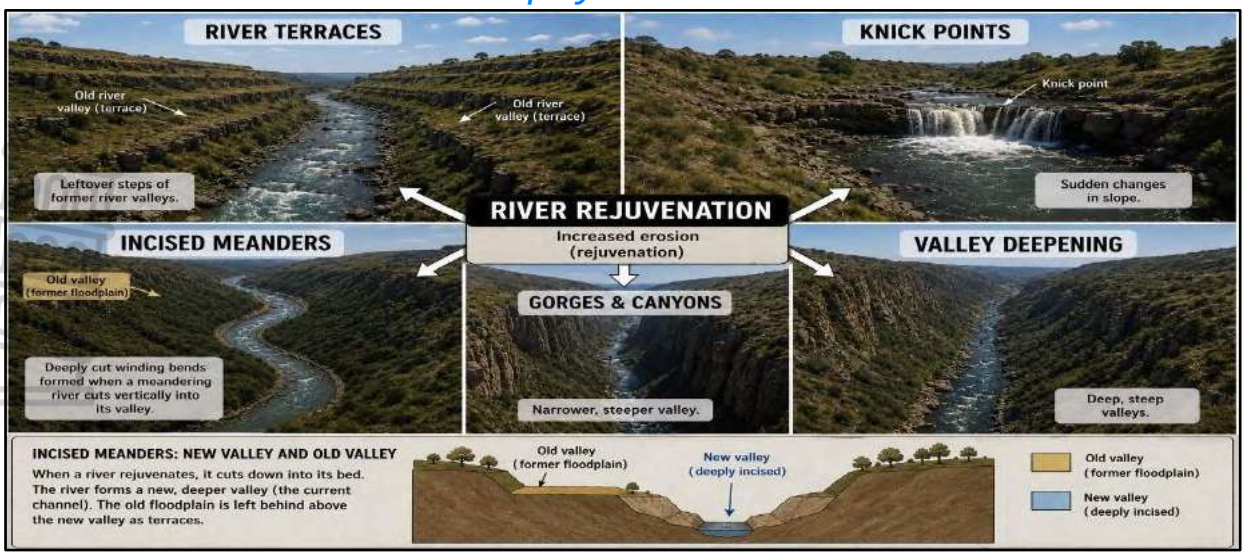
River capture is a river that captures another river and gains more water and energy, causing renewed vertical erosion



[https://www.britannica.com/science/residual-landform]

LANDFORMS RESULTING FROM RIVER REJUVENATION

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[Source: https://www.cseplus.in/]

1. Knickpoint • A sudden break or change in the river's slope where rejuvenation begins	**2. Waterfalls** • Form where the river flows over a steep drop
3. Rapids • Fast-flowing, turbulent sections of the river.	**4. Gorges** • Deep, narrow valleys formed by intense vertical erosion.
5. River Terraces • Step-like benches along the sides of a valley, representing former floodplains left above the new river level.	**6. Incised (Entrenched) Meanders** • Deeply cut winding bends formed when a meandering river cuts vertically into its valley.

EFFECTS OF RIVER REJUVENATION		
ON THE ENVIRONMENT	**ON THE ECONOMY**	**ON PEOPLE**
• Forms new habitats for plants and animals. • Increases landscape diversity.	• Attracts tourists to waterfalls, gorges, and rapids. • Provides opportunities for hydroelectric power generation. • Supports recreation such as rafting and hiking. • Creates spectacular scenery (aesthetic).	• Creates jobs through tourism. • Improves access to water for hydroelectric projects. • Offers educational and research opportunities.

2.7 Refer to the figure below showing knickpoint and incised meanders.

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[Source: https://online.htseden.co.za]

2.7.1	What type of erosion is associated with river rejuvenation?	(1 x 1)	(1)
2.7.2	River capture (increases/decreases) river rejuvenation on the captor stream.	(1 x 1)	(1)
2.7.3	What is the Knickpoint?	(1 x 2)	(2)
2.7.4	Explain the formation of the incised meanders.	(2 x 2)	(4)
2.7.5	In a paragraph of approximately EIGHT lines, explain how landforms will change in the lower course after river rejuvenation.	(4 x 2)	(8)

RIVER CAPTURE

The process by which one river, intercepts and diverts(robs) the headwaters of another river.

CAUSES OF RIVER CAPTURE

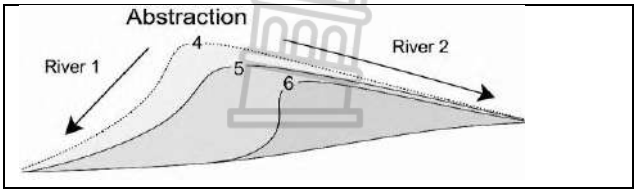
1. **Differences in gradient**
   A river with a steeper slope has greater erosive power and may capture a nearby river.
2. **Differences in rock type**
   softer rocks erode more easily than harder rocks, allowing one river to extend its valley faster.
3. **Rainfall**

Heavy rainfall increases river discharge and erosion, making river capture more likely

Process of River Capture

- Energetic river must erode to the watershed (headward erosion).
- Watershed is lowered as a result of headward erosion(abstraction)

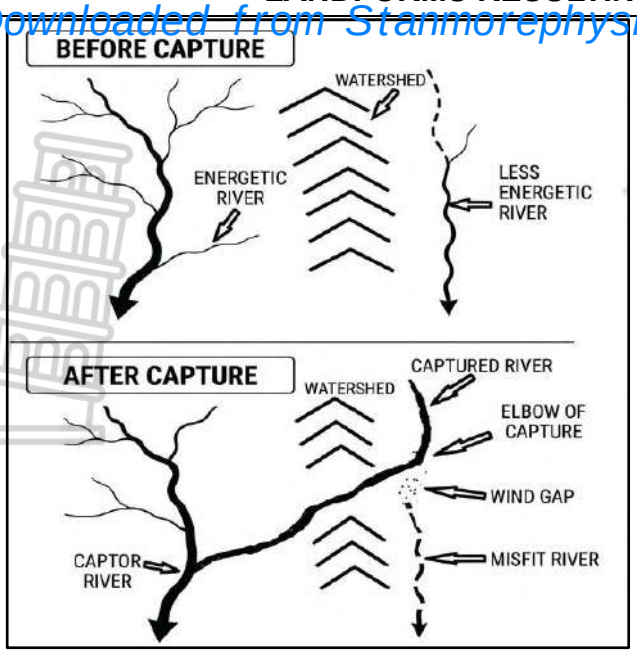
Illustration showing the Abstraction of the watershed



[Adapted from:www.eccurriculum.co.za]

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LANDFORMS RESULTING FROM RIVER CAPTURE



[Source: Examiner's own sketch]

1. **Elbow of capture**
   - A sharp bend where the captured river changes direction.
2. **Wind gap**
   - A dry valley where the captured river once flowed.
3. **Beheaded stream/Captured**
   - The lower part of the captured river that has lost most of its water.
4. **Misfit stream**
   - A small river flowing in a valley that is much larger than needed for its current size.

IMPACT OF RIVER CAPTURE ON THE CAPTOR AND CAPTURED STREAMS

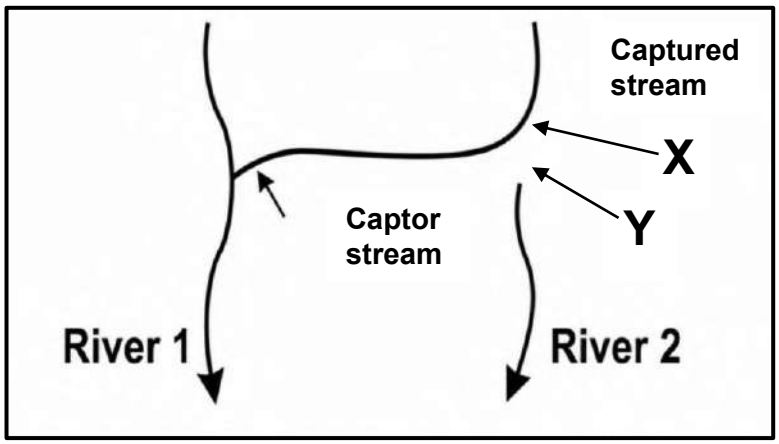
CAPTOR STREAM	CAPTURED STREAM
• Gains more water (greater discharge). • Increases river velocity. • Carries more sediment. • Becomes more powerful and erodes its valley more deeply. • May become wider and deeper.	• Loses much of its water supply. • River discharge decreases. • Erosion becomes weaker. • Deposition may increase. • The river may shrink into a misfit stream or even dry up in places.

IMPACT OF RIVER CAPTURE ON THE ENVIRONMENT

POSITIVE IMPACTS	NEGATIVE IMPACTS
• It forms new habitats for plants and animals. • Increases water supply in the captor river basin.	• Reduces water available in the captured river basin. • Alters aquatic ecosystems. • Can lead to loss of wetlands. • May increase erosion and sedimentation in the captor river.

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2.8 Refer to the sketch below showing river capture.



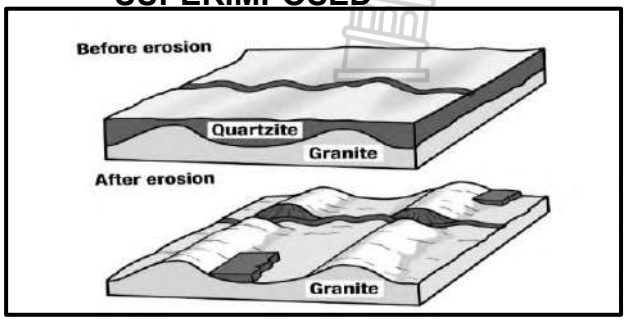
[source: examiner's own sketch]

2.8.1	Define the concept *river capture.*	(1 x 2)	(2)
2.8.2	Identify features marked **X** and **Y**.	(2 x 1)	(2)
2.8.3	Describe the type of erosion associated with river capture.	(1 x 1)	(1)
2.8.4	How will river capture affect ecosystems along the misfit stream?	(2 x 2)	(4)
2.8.5	Explain how steepness of the slope and rock resistance will influence the process of river capture.	(2 x 2)	(4)
2.8.6	Draw a sketch showing the abstraction of the watershed. Indicate the following: Position of old watershed. Position of new watershed. The flow of rivers.	(4 x 1)	(4)

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SUPERIMPOSED AND ANTECEDENT DRAINAGE PATTERNS

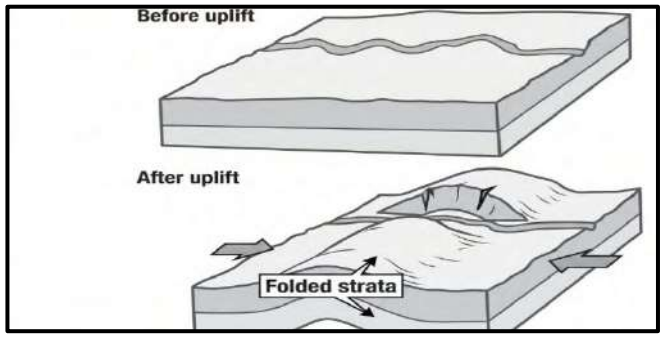
SUPERIMPOSED



[https://www.google.com/search]

- A river system that maintains its original course and flow pattern across an area regardless of the underlying, older rock structures.
- It happens when a stream forms on a younger covering layer of rock, cuts down through it, and keeps flowing the same way even after wearing through to different, older, and harder rock layers underneath.
- It is a pattern that does not correspond with the structure of the existing surface that it flows over.
- The river is younger than the underlying rock structure through which it flows.

ANTECEDENT



[https://www.google.com/search]

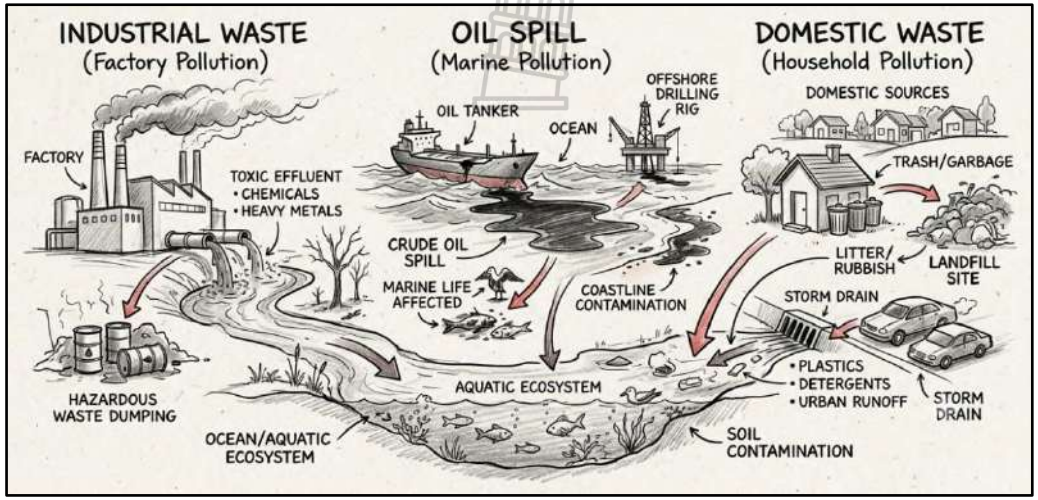
- It is when a river is older than the land features it crosses.
- The river maintains its original path because its downward erosion keeps pace with tectonic uplift.
- The river is older than the underlying rock structure through which it flows.

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RIVER MANAGEMENT
The planning, care, and control of rivers and their drainage basins. Using river resources in a sustainable way so that it will be available for future generations.
WHY IS IT NECESSARY TO TAKE CARE OF THE DRAINAGE BASIN?
• Water is used from the river channel in irrigation schemes. • Rivers are used to generate hydro-electric power. • Transporting of goods • Leisure activities such as fishing and tourist attraction • Supplies water for domestic and industrial use. • Control flooding • To ensure that the ecosystem remains healthy and in balance • To protect water usage for present and future generations.

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IMPACT OF PEOPLE OF DRAINAGE BASINS AND CATCHMENT AREAS



[Source:https://link.springer.com/article/10.1007/s13201-024-02227-x]

- River pollution - domestic sewage, agricultural waste and industrial waste, result in the loss of oxygen available for plants and animals living in the water.
- Overgrazing - the removal of vegetation in catchment areas reduces infiltration and thus the amount of ground water available in the dry season.
- Deforestation - increasing surface runoff, accelerating soil erosion, and degrading water quality.
- Human settlement - more artificial surfaces results in greater surface run off.

STRATEGIES TO MANAGE DRAINAGE BASINS/ CATCHMENT AREAS

- Fines to be imposed for dumping into rivers.
- Create buffer zones close to rivers to prevent industrial development being too close.
- Encourage the growth of vegetation and trees to trap surface run-off and decrease erosion.
- Frequent testing of water quality to prevent disruption of ecosystem.
- Awareness campaigns and legislation to prevent dumping into rivers.
- Educate farmers on sustainable practices.
- Conserve wetlands.

  Encourage recycling of waste rather than dumping into the rivers.

2.9 Refer to the case study on the Umgeni River sewage below.

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The municipal sewage works is a primary source of pollution along the Umgeni River. The river mouth is a popular recreation and tourism area in Durban, famous for events like the Duzi Canoe Marathon. However, water tests reveal high *E.coli* levels due to chronic sewage pollution.

Municipal spokesperson Gugu Sisilana stated that the primary source of pollution is sewer overflows caused by blockages, vandalised infrastructure, and illegal connections. Residents directly contribute by dumping foreign objects into the sewerage—including rags, building rubble, nappies, oils, and fats.

This poor management and contamination lead to chemical pollution and nutrient overload, causing a loss of biodiversity, fish and aquatic life mortality, degraded habitats, and damaged estuarine environments, as well as forcing local beach closures. The municipality is currently repairing flood-damaged wastewater treatment plants and planning upgrades.

2.9.1	According to the extract, what is the main source of pollution in the Umgeni River?	(1 x 1)	(1)
2.9.2	Give a reason from the photograph that indicates the level of pollution is harmful.	(1 x 2)	(2)
2.9.3	Identify ONE use of the river as mentioned in the article.	(1 x 1)	(1)
2.9.4	Explain how humans have contributed to the high level of pollution of the Umgeni River.	(1 x 2)	(2)
2.9.5	According to the case study, how did the poor river management impact the health of the river and its surrounding?	(2 x 2)	(4)
2.9.6	Suggest strategies that the local municipality can put in place to ensure the sustainability of the Umgeni River.	(3 x 2)	(6)

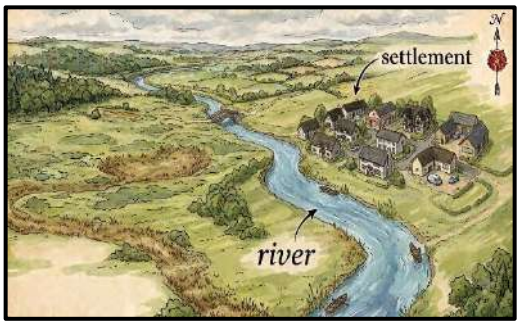
STUDY OF SETTLEMENTS

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CONCEPT	DEFINITION
Settlement	Place where people live which includes buildings, economic activities and transport networks.
Site	Refers to the exact piece of land on which settlement is built.
Situation	Location of a settlement in relation to the surrounding area.
Wet point settlement	Settlements located close to the water source.
Dry point settlement	Settlements that are found away from the marshy or flood prone areas because water poses a threat.
Rural settlement	It is a settlement with one dominant function. Includes isolated farmstead, Hamlet and a Village.
Urban settlement	Is a settlement which is multifunctional. It includes Town, City, Metropolis, Conurbation and Megalopolis.

FACTORS INFLUENCING SITE

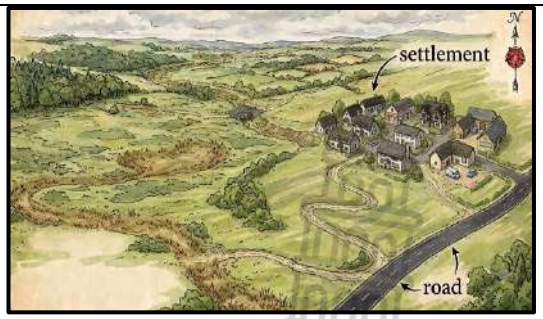
- ❖ Water availability e.g. rivers
- ❖ Relief (flat land)
- ❖ Soil fertility
- ❖ Climate/aspect
- ❖ Natural resources



[Source: https://share.gemini.google/vjVYdJvQY5rS]

FACTORS INFLUENCING SITUATION

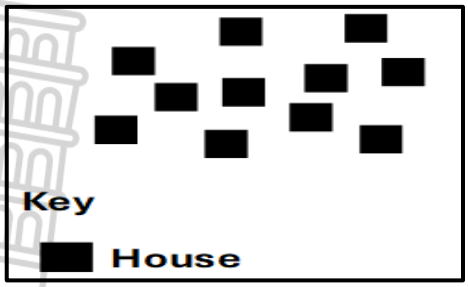
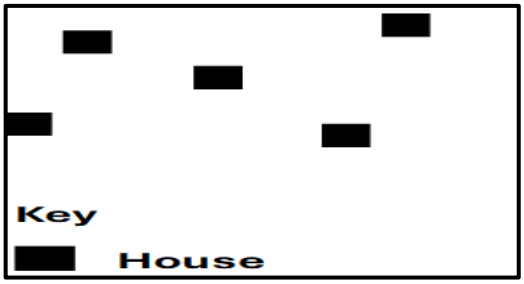
- ❖ Railways
- ❖ Roads
- ❖ Airports
- ❖ Distance to markets



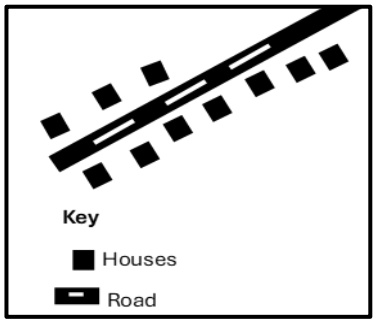
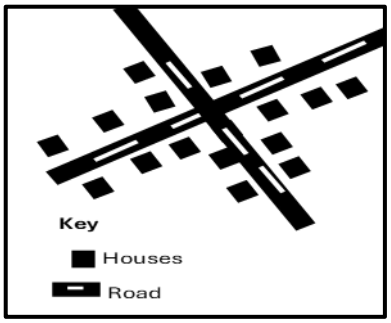
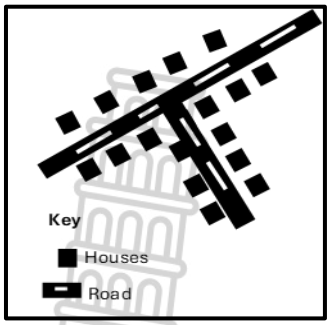
[Source: https://share.gemini.google/VuuLNJgNIAkj]

CLASSIFICATION OF SETTLEMENTS ACCORDING TO PATTERN

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NUCLEATED PATTERN	DISPERSED PATTERN
Buildings are close to each other.  [Source: Own sketch)	Buildings are far apart from each other.  [Source: Own sketch)
Advantages ❖ Sharing of ideas ❖ Sharing of equipment ❖ Social interaction ❖ Safety	**Advantages** ❖ Privacy ❖ Own decision making ❖ Large profits
Disadvantages ❖ Lack of privacy ❖ Conflict may arise ❖ Small piece of land with small profits ❖ Overutilization of resources	**Disadvantages** ❖ Lack of social interaction (boredom) ❖ Distant services ❖ Easy target for criminals ❖ Underutilization of resources

Classification of settlements according to shape

Linear	Cross road	T-shaped
Develops along a line feature which can be a road, river, canal etc.  	Develops on roads that intersect and radiate outward.  	Develops when a secondary road joins the main road. 
[Source: Own sketches)		

STUDY OF SETTLEMENTS: ACTIVITIES

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3.1 Complete the statement in Column A with the correct option in Column B. Write only the letter **X** or **Y** next to the question numbers 3.1.1 to 3.1.8 in the answer book e.g., 3.1.9 X

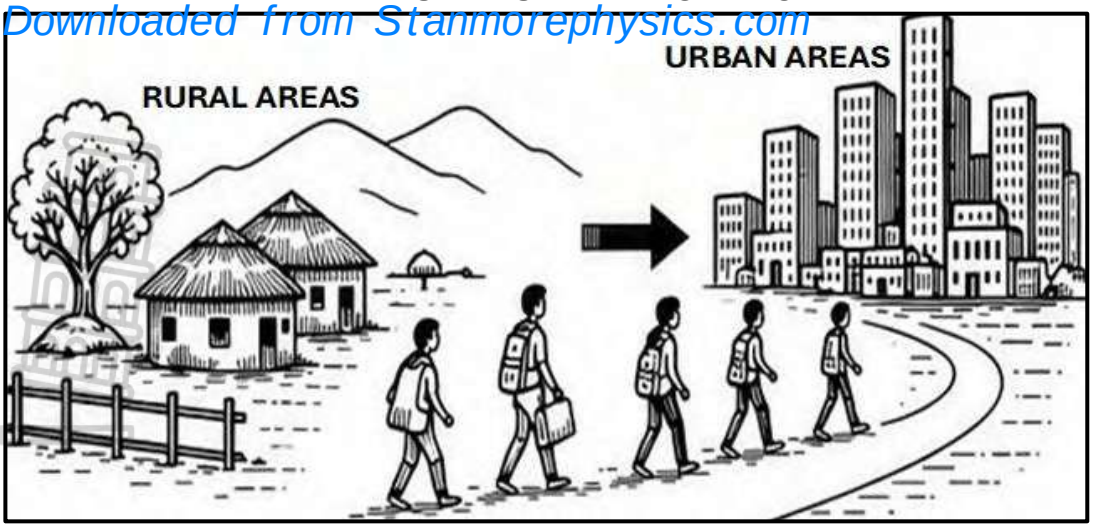
	COLUMN A	COLUMN B
3.1.1	Location of a settlement in relation to the surrounding area.	**X** site **Y** situation
3.1.2	Settlement that is located away from the water source since water poses a threat.	**X** dry point settlement **Y** wet point settlement
3.1.3	Buildings are far away from each other.	**X** nucleated **Y** dispersed
3.1.4	The farmer farms in order to get a profit.	**X** commercial farming **Y** subsistence farming
3.1.5	This type of settlement is uni-functional.	**X** rural **Y** urban
3.1.6	The yield per hectare is relatively lower.	**X** intensive farming **Y** extensive farming
3.1.7	A…has both rural and urban functions.	**X** farmstead **Y** village
3.1.8	The main difference between rural and urban areas …	**X** function **Y** buildings
		(8 x 1) (8)

RURAL SETTLEMENT ISSUES

CONCEPT	DEFINITION
Rural-urban migration	Movement of people from rural areas to urban areas.
Rural depopulation	Decrease in the number of people in rural areas.
Push factors	Factors that force people to leave rural areas.
Pull factors	Factors that attract people into urban areas.
Land reform	A policy that aims to bring about equitable distribution and access to land to redress past injustices.
Land redistribution	An act that provides previously disadvantaged people with land for residential and farming purposes.
Land restitution	Compensating and restoration of land to people with land they lost during apartheid– due to forceful removals.
Land tenure	Provision of land ownership rights (security) to the people.

RURAL-URBAN MIGRATION

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[Source: Gemini.Google]

Push factors

- Lack of basic services
- Poor infrastructure
- Unemployment
- Poverty
- Mechanisation of farms

Pull factors

- Access to basic services
- Proper infrastructure
- Availability of jobs
- Better standard of living
- Variety of entertainment activities

Consequences in rural areas

- Closure of services
- Ghost settlements
- Brain drain
- Decrease in productivity
- Under- utilisation of resources
- Family units are broken

Consequences in urban areas

- Influx of informal settlements
- Increased crime rate
- Demand for basic services e.g. housing
- Traffic congestion & pollution
- Overcrowding

Strategies to address rural depopulation

- Improve basic services (housing, potable water, electricity etc.)
- Provision of jobs
- Improve infrastructure e.g. roads
- Upskilling farmers for commercial farming
- Accelerate land reform programme
- Encourage entrepreneurial opportunities/ encourage investment
- Encourage tourism
- Provide entertainment activities
-

LAND REFORM

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Land redistribution	Land restitution	Land tenure
An act that provides previously disadvantaged people with land for residential and farming purposes.	Compensating and restoration of land to people with land they lost during apartheid– due to forceful removals.	Provision of land ownership rights (security) to the people.
 [Source: Gemini.Google]	 [Source: Gemini.Google]	 [Source: Gemini.Google]

Challenges of land reform

- ❖ Willing buyer willing seller clause
- ❖ Limited budget (costly process)
- ❖ Disagreement between government and traditional leaders
- ❖ Corruption/ political interference delays the process
- ❖ Lack of training and support
- ❖ Existing gaps (grey areas)

RURAL SETTLEMENT ISSUES : ACTIVITY

3.2 Refer to the article on rural-urban migration.

THE CHALLENGE OF RURAL-URBAN MIGRATION

Many young people leave rural areas in South Africa and move to towns and cities each year. They are attracted by better employment opportunities, improved education, healthcare and access to services. However, rapid rural–urban migration has also resulted in housing shortages, increased unemployment, traffic congestion and the growth of informal settlements in many urban areas.

[Source: Gemini.Google]

3.2.1 Define the concept *rural-urban migration*. (1 x 2) (2)

3.2.2 According to the article, state ONE socio-economic factor that attracts people to move to urban areas. (1 x 1) (1)

3.2.3 Explain how rural-urban migration can lead to rural depopulation. (1 x 2) (2)

3.2.4 Explain TWO social negative impacts of rural–urban migration in urban areas. (2 x 2) (4)

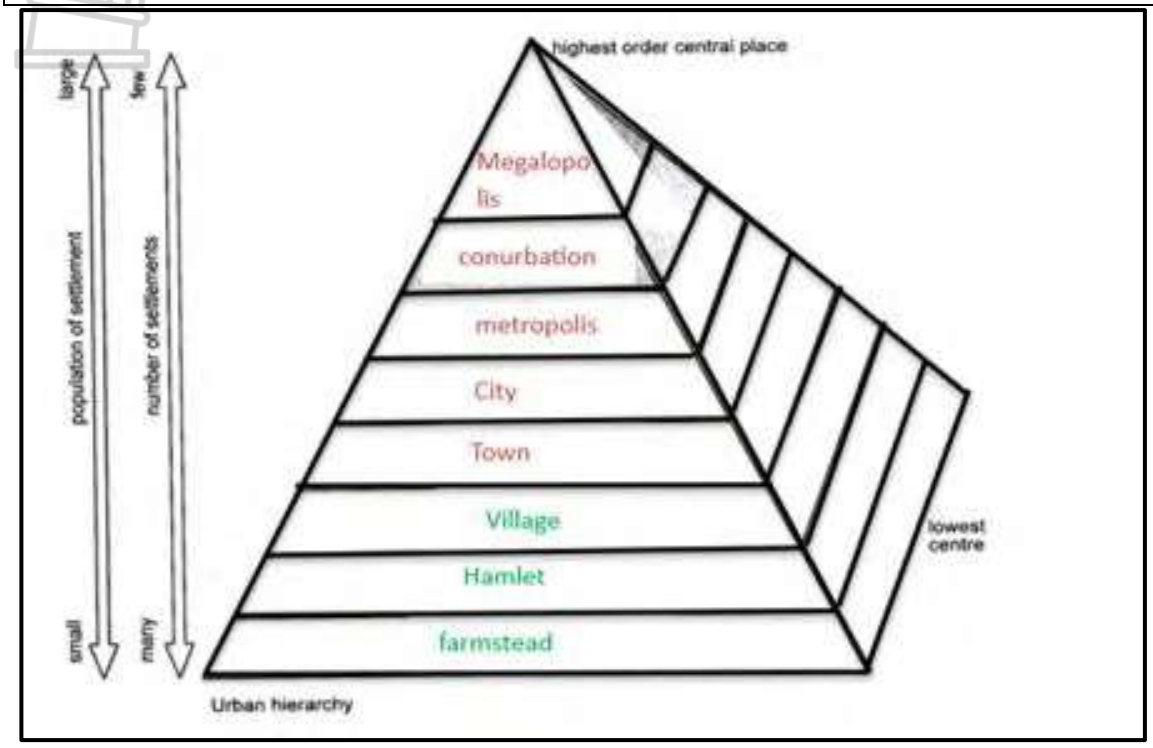
3.2.5 Suggest THREE strategies that the South African government could implement to reduce excessive rural–urban migration. (3 x 2) (6)

URBAN HIERARCHY

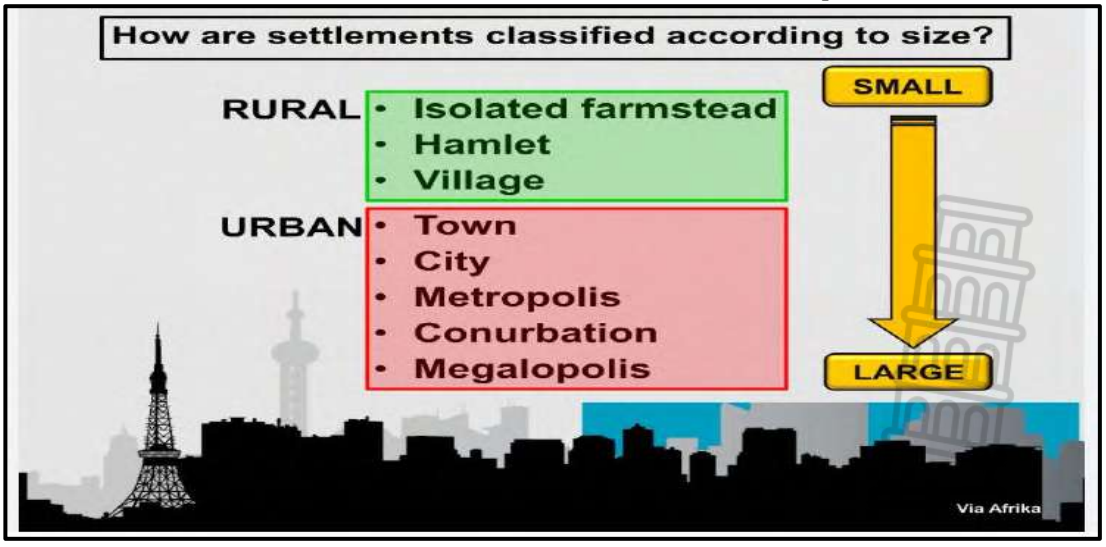
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This refers to the arrangement of settlements from the smallest to the largest in an urban area.

The more people and functions a settlement have, the higher in the hierarchy it will be. At the bottom of the pyramid is the smallest (farmstead) and at the top is the largest settlement (megalopolis). Settlement is classified according to function which influences its size and complexity and population size.



[Source: Own sketch]



[Source: https://www.calssify-settlements-according-to-size]

CONCEPT	DEFINITION
Megalopolis	The largest settlement that forms when many conurbations join together e.g., Boston, New York and Washington.
Conurbation	The combination of many towns and cities that merge with each other, e.g., Johannesburg, Midrand and Pretoria.
Metropolis	A single city (Durban) that is surrounded by many independent towns such as Pinetown, Tongaat and Amanzimtoti
City	A large urban centre that offers a variety of services including specialized functions such as judicial and financial, e.g., Pietermaritzburg
Town	An urban area that does not offer an extensive range of urban functions and occupies a smaller geographical area, e.g., Ladysmith
Village	A settlement that offers both rural and urban functions.
Hamlet	A small grouping of farmsteads.
Isolated Farmstead	Refers to a single farm which has a main building and can have outbuildings for labourers and sheds.

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URBAN HIERACHY: ACTIVITIES

3.3 Various options are provided as possible answers to the following questions. Choose the answer and write only letter (A – D) next to the question numbers. (3.3.1 to 3.3.7) in the ANSWER BOOK. e.g., 3.3.8 D

3.3.1 Settlement is classified according to …

A. Size
B. Complexity
C. Hierarchy
D. Function

3.3.2 The largest settlement is found at the … of the hierarchy

A. Bottom
B. Middle
C. Base
D. Top

3.3.3 The smallest settlement is known as…

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A. City
B. Conurbation
C. Farmstead
D. Hamlet

3.3.4 Small towns have …. population … services

A. Smaller and many
B. Larger and fewer
C. Smaller and fewer
D. Low and more

3.3.5 Which settlement will have more high order centres?

A. Isolated farmstead
B. Hamlet
C. Town
D. City

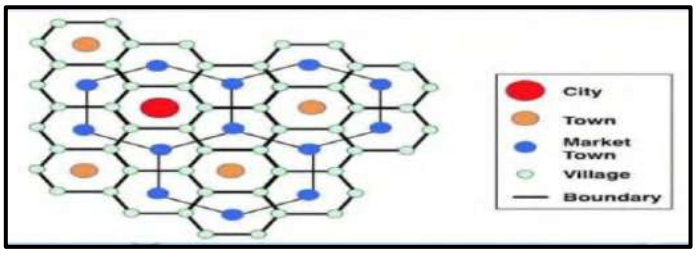
3.3.6 An urban settlement that offers fewest services

A. Village
B. Conurbation
C. Town
D. Metropolis

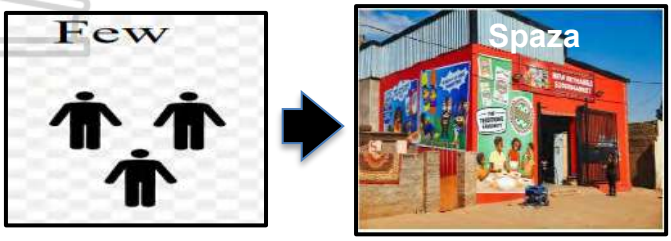
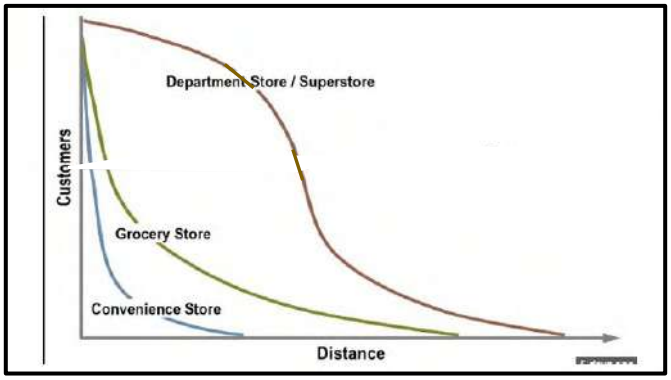
3.3.7 The largest rural settlement…

A. Hamlet
B. Isolated farmstead
C. Village
D. Megalopolis

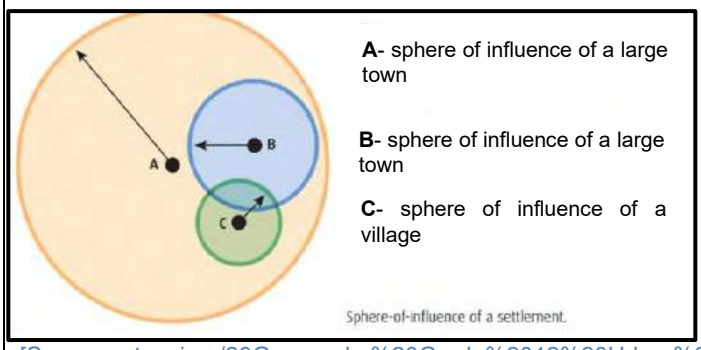
(7 x 1) (7)

CONCEPT	DEFINITION
CENTRAL PLACE  [Source: https://www.google.com/search?q=central+place+theory&oq=central+&gs_lcrp=EgZjaHJvb]	❖ A settlement that provides goods and services to the surrounding rural population.

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THRESHOLD POPULATION  [Source:https://www.google.com/search?sa=X&sca_esv=2c719d755bc25006&sxsrf=]  [Source:https://www.google.com/search?q=person+spazalocation]	❖ The minimum number of customers needed to make a business profitable. ❖ Shops selling high order goods such as furniture, vehicles etc. need a larger population to be profitable because these goods are bought infrequently. ❖ Shops selling low order goods need a low threshold population to remain profitable because people buy these goods frequently.
RANGE  [Source: google image]	❖ Maximum distance customers are prepared to travel to buy goods and services. ➢ People travel short distances to buy low order goods or services. ➢ People travel longer distances to buy high order goods or services.
LOW ORDER GOODS/ CONVENIENT GOODS  [Source:https://www.google.com/search?sca_esv=75d6586d45596069&sxsrf=APpeQns1UAIEN9-umkwqtRIZupnyDv	❖ These are goods and services required frequently (daily basis) such as bread, milk, sugar, eggs. ➢ Has a small threshold population. ➢ Small range ➢ Offered by low order centres. ➢ They are usually cheap.

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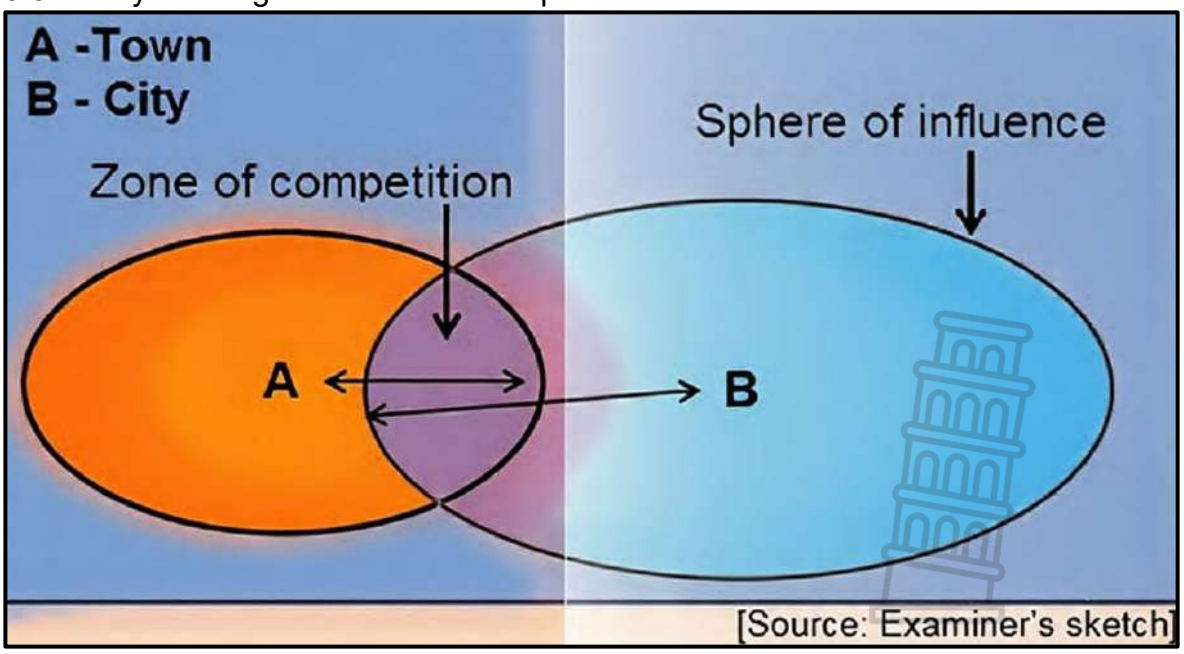
HIGH ORDER GOODS / INCONVENIENT GOODS  https://www.google.com/search?q=vehicle&sca_esv=f27d8505aff6f8c7&udm=2&biw=1536&bih=	❖ These goods and services are bought infrequently such as cars, furniture, attorney, cardiologist. ➢ Large threshold population. ➢ Large range ➢ Offered by high order centres.
SPHERE OF INFLUENCE  **A**- sphere of influence of a large town **B**- sphere of influence of a large town **C**- sphere of influence of a village [Source:extension:/20Geography%20Grade%2012%20Urban%20Settlement%20heirachies%20PPT's.pdf]	❖ Refers to the market or catchment area from where an urban settlement draws its customers. In urban areas, the size, and number of functions determines the sphere of influence. ➢ Small towns draw customers from a smaller catchment area. ➢ Cities draw customers from greater distances and thus have a greater sphere of influence over the surrounding area

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3.4 Match the statement in column A with the options in column B. Write only the letter (Y or Z) next to the question numbers (2.2.1 to 2.2.7) in the ANSWER BOOK, e.g., 2.2.8 Y

3.4.1	The minimum number of customers needed to make a business profitable.	**X** range **Y** threshold population
3.4.2	Range is a … distance that customers are willing to travel to obtain goods and services.	**X** minimum **Y** maximum
3.4.3	Shops selling low order goods require a…threshold population.	**X** larger **Y** smaller
3.4.4	A settlement that provides goods and services to the surrounding rural areas.	**X** sphere of influence **Y** central place
3.4.5	Larger settlements offer a greater number of functions therefore have a …. Sphere of influence.	**X** larger **Y** smaller
3.4.6	The range would be greater when buying …	**X** bread **Y** car
3.4.7	High order centres are usually found in …	**X** cities **Y** villages
		(7 x1) (7)

3.5. Study the diagram below on the sphere of influence.



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3.5.1 Define the concept *sphere of influence*. (1 x 2) (2)

3.5.2 What determines the size of the sphere of influence of an urban settlement? (1 x 1) (1)

3.5.3 Explain why there's an overlap of the town's sphere of influence and that of the city. (2 x 2) (4)

3.5.4 Discuss reasons why the range of different goods offered in city **B** is not the same. (2 x 2) (4)

3.5.5 Explain the negative impact of locating a high order service in a place with a low threshold population. (2 x 2) (4)

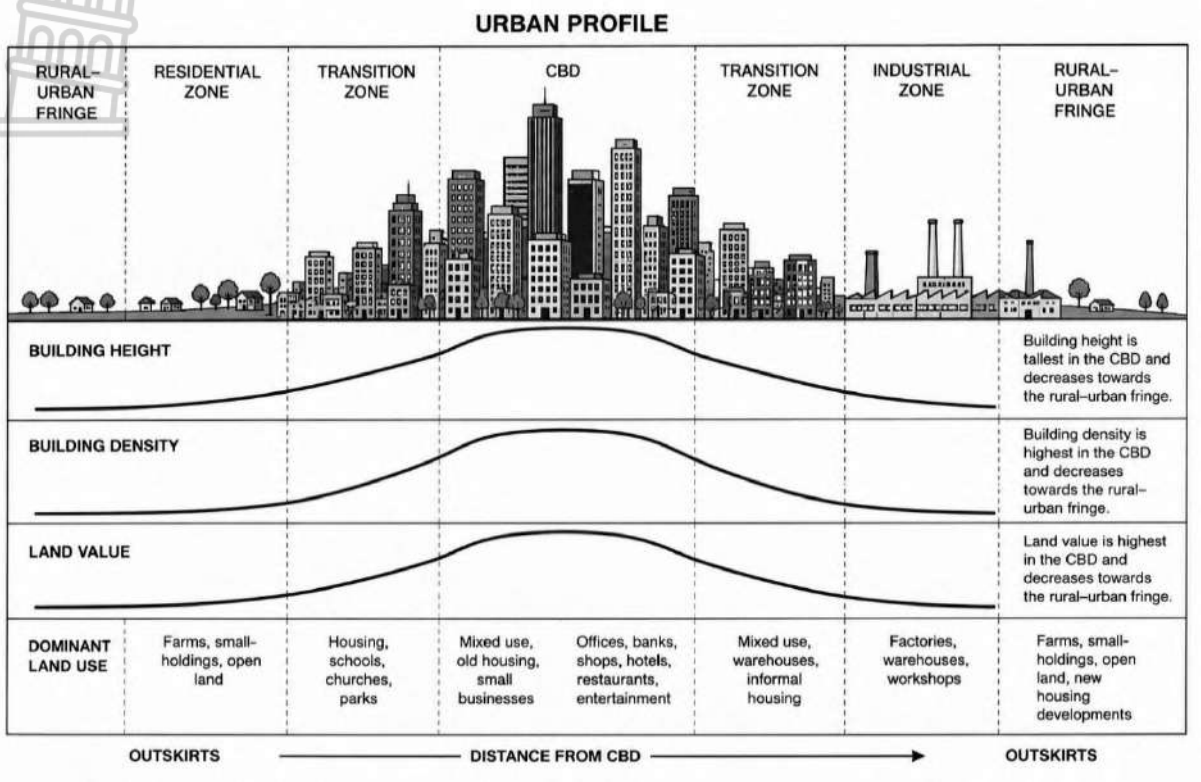
URBAN STRUCTURE AND PATTERNS

CONCEPTS	DEFINITION
Urbanization	Increase in percentage of a population living in urban areas.
Urban growth	Absolute Increase in number of people living in urban areas.
Urban sprawl	Formless (uncontrollable) expansion of urban areas.
Urban expansion	The physical growth of an urban area.
Counter-urbanization	Process by which people move out of cities to the outskirts.
Level of urbanization	The percentage of people that live in urban areas.
Rate of urbanization	The percentage by which an urban population is increasing.
CBD	City's commercial, financial, and often historical core.
Satellite town	Smaller town near a larger city, dependent but with some autonomy.
Land use	The actual activities/functions on land (e.g., housing, shops, factories, parks).
Land use zone	A land in an urban area used mainly for one dominant function.
Urban structure	The arrangement of different land use zones, buildings, roads and activities within a town or city.
Urban profile	Side view of a city.

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COMPONENTS OF URBAN STRUCTURE

- Urban Profile
- Building density
- Land use zones
- Street patterns



[Source: URBAN PROFILE GRADE 12 - Search Images]

Characteristics

- Tallest buildings in the CBD.
- Building height decreases away from the CBD.
- Land value is highest in the CBD and decreases towards the rural-urban fringe.
- Building density is highest in the CBD and lowest on the outskirts.

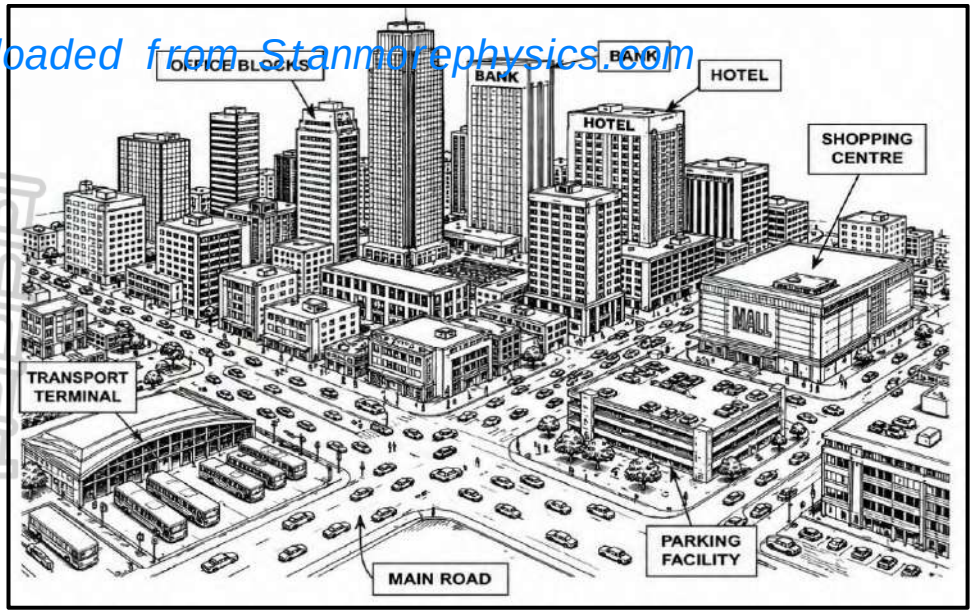
LAND USE ZONES

1. **Central Business District (CBD)**

Characteristics of the CBD

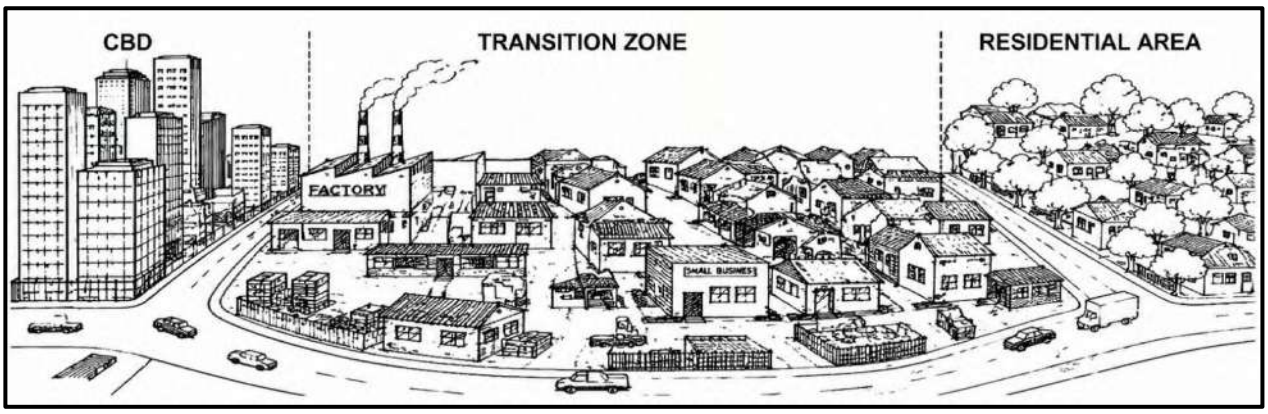
- Commercial centre of the city
- Tall buildings with high building density
- Highest land value
- Maximum accessibility
- Banks, offices, shops and hotels

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[Source: Drawing of an Urban Profile in Geography - Search Images]

2. Transition Zone



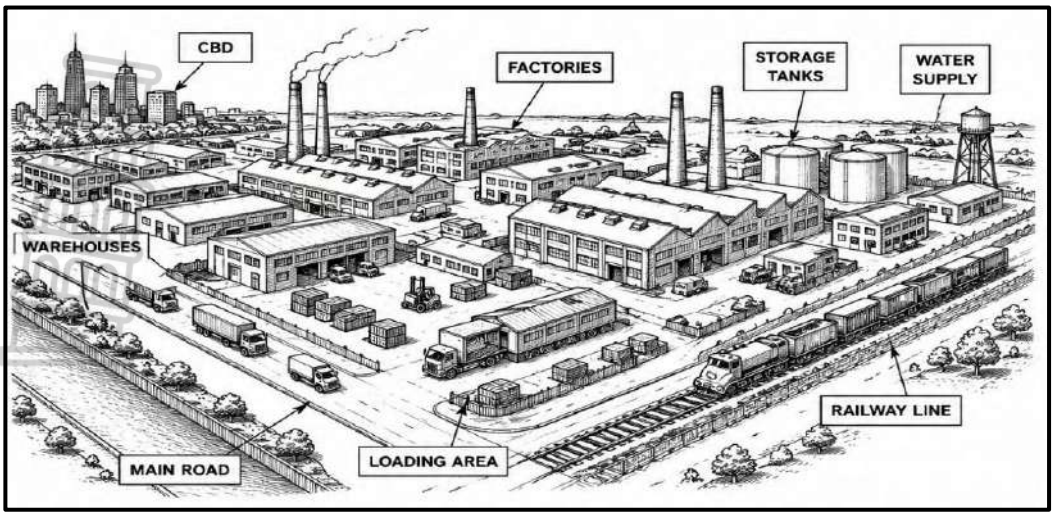
[Source: Drawing of an Urban Profile in Geography - Search Images]

Characteristics of the transition zone

- Old dilapidated buildings (and infrastructure) because they are not maintained.
- Mixed land use
- Urban decay may occur
- Warehouses and small industries
- Informal housing common
- High land value as it the future expansion of the CBD
- High crime rate, twilight activities and graffiti

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3. Industrial Zone



[Source: urban profile in geography - Google Search]

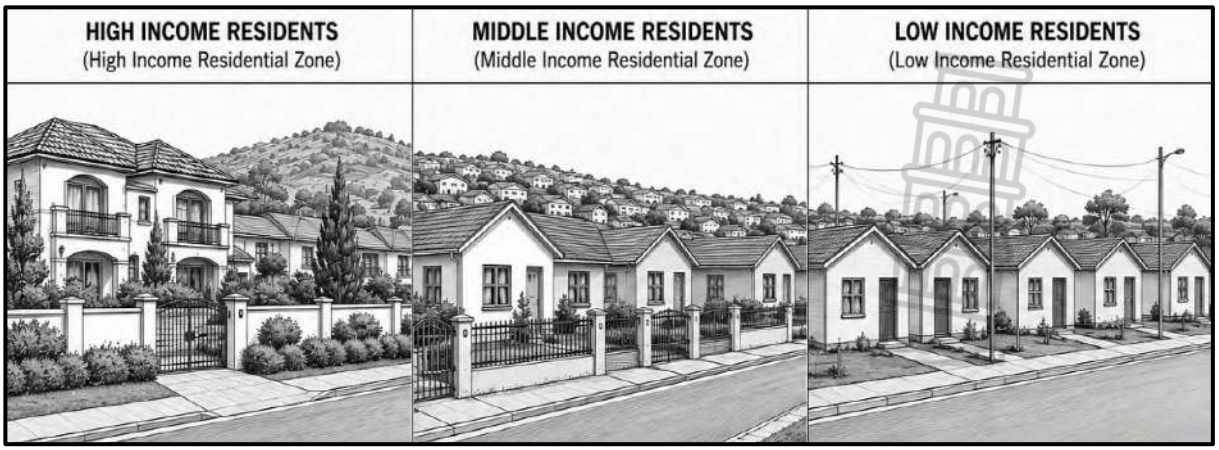
Characteristics of the industrial zone (Heavy industrial zone)

- ❖ Factories and warehouses
- ❖ Located near bulky transport facilities
- ❖ Requires large flat land
- ❖ Causes noise and air pollution
- ❖ Produces heavy and bulky goods

4. Residential Zone

The three types of residential zone

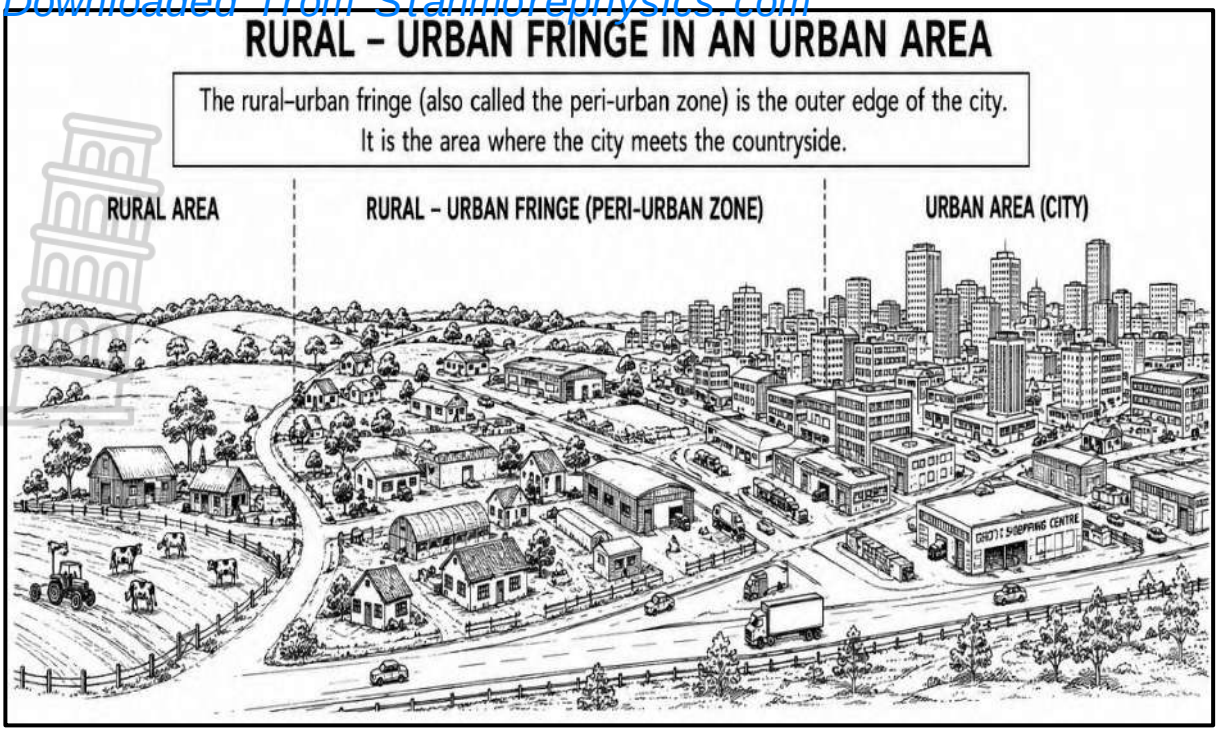
- ❖ Low, middle and high-income housing
- ❖ Building density varies with income



[Source: urban land use urban profile in geography - Google Search]

5. Rural-Urban Fringe

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[Source: URBAN PROFILE GRADE 12 - Search Images]

Characteristics of the rural-urban fringe

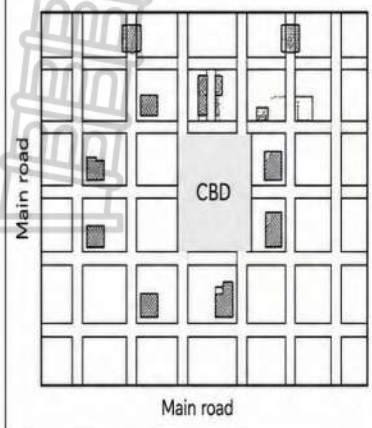
- Edge of the city
- New housing developments
- Farms and small holdings
- Airports and large shopping centers
- Future urban expansion
- Low land value
- Generally flat land

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STREET PATTERNS

STREET PATTERNS IN URBAN AREAS

1. GRID IRON PATTERN



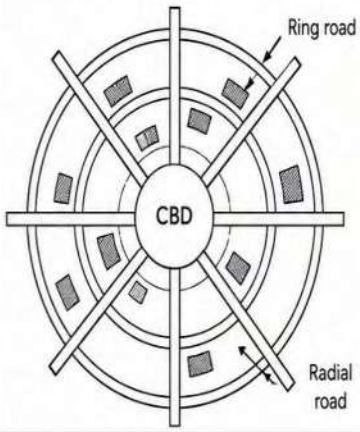
ADVANTAGES

- Easy to plan and layout.
- Roads are straight and easy to navigate.
- Efficient use of land.
- Easy and cheap to install services (water, electricity, sewerage).
- Allows for future expansion in all directions.

DISADVANTAGES

- Traffic congestion at intersections.
- Not suitable for areas with uneven topography.
- Very straight – can be dull and lacks aesthetic appeal.
- Long walking distances.

2. RADIAL PATTERN



ADVANTAGES

- Traffic is distributed from the CBD to the suburbs.
- Easy access to the CBD from all directions.
- Suitable for hilly areas.
- Attractive and can be made very impressive.

DISADVANTAGES

- More expensive to construct.
- Requires more land.
- Difficult to plan public transport routes.
- Not suitable for very large cities.

3. IRREGULAR PATTERN



ADVANTAGES

- Adapts to physical features of the land (relief, rivers, etc.).
- More interesting and attractive.
- Often found in old parts of towns and around natural features.

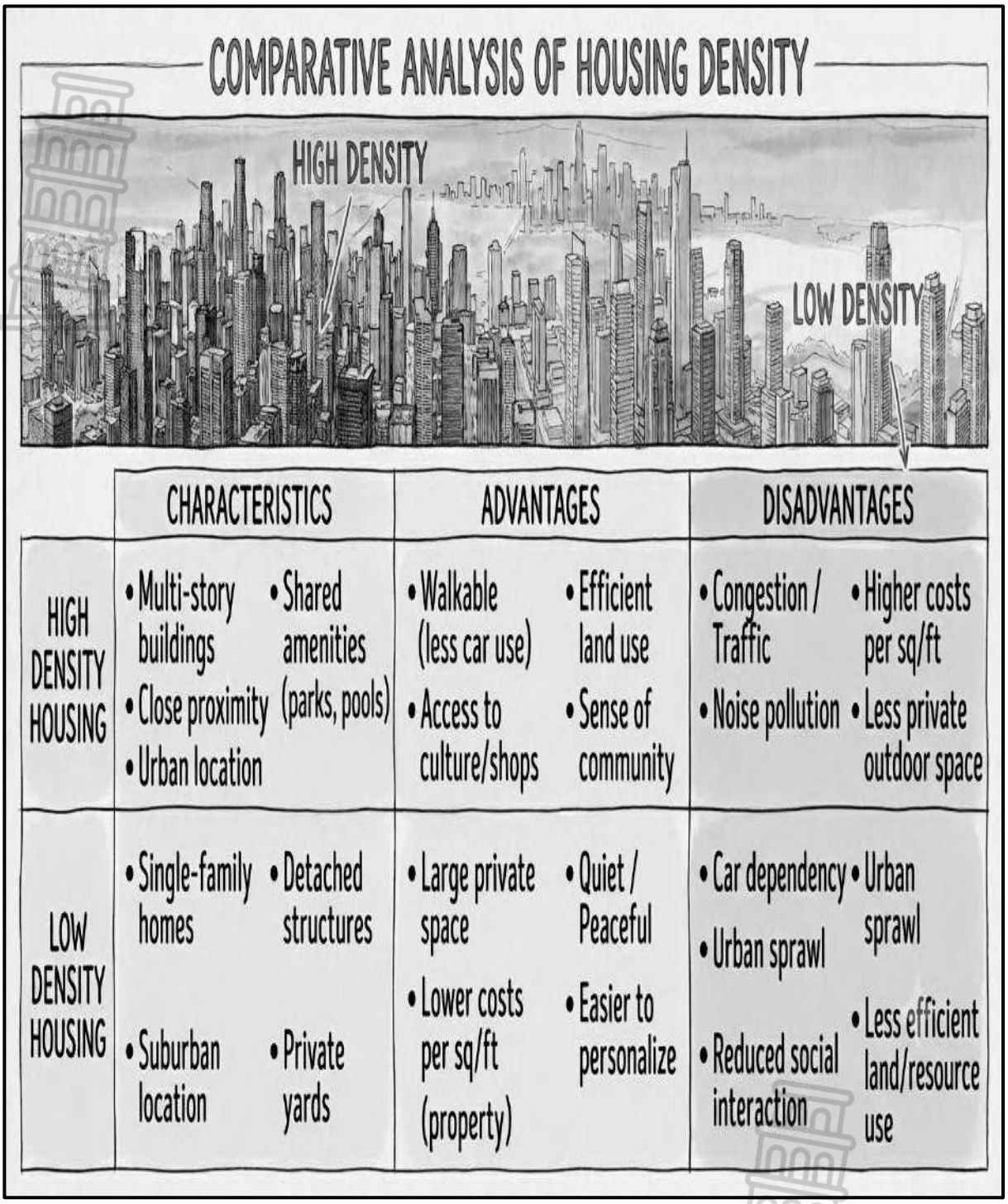
DISADVANTAGES

- Difficult to plan and lay out.
- Difficult to navigate.
- Roads are often narrow and windy – causing traffic congestion.
- Difficult and expensive to install services.

[Source: URBAN PROFILE GRADE 12 - Search Images]

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BUILDING DENSITY

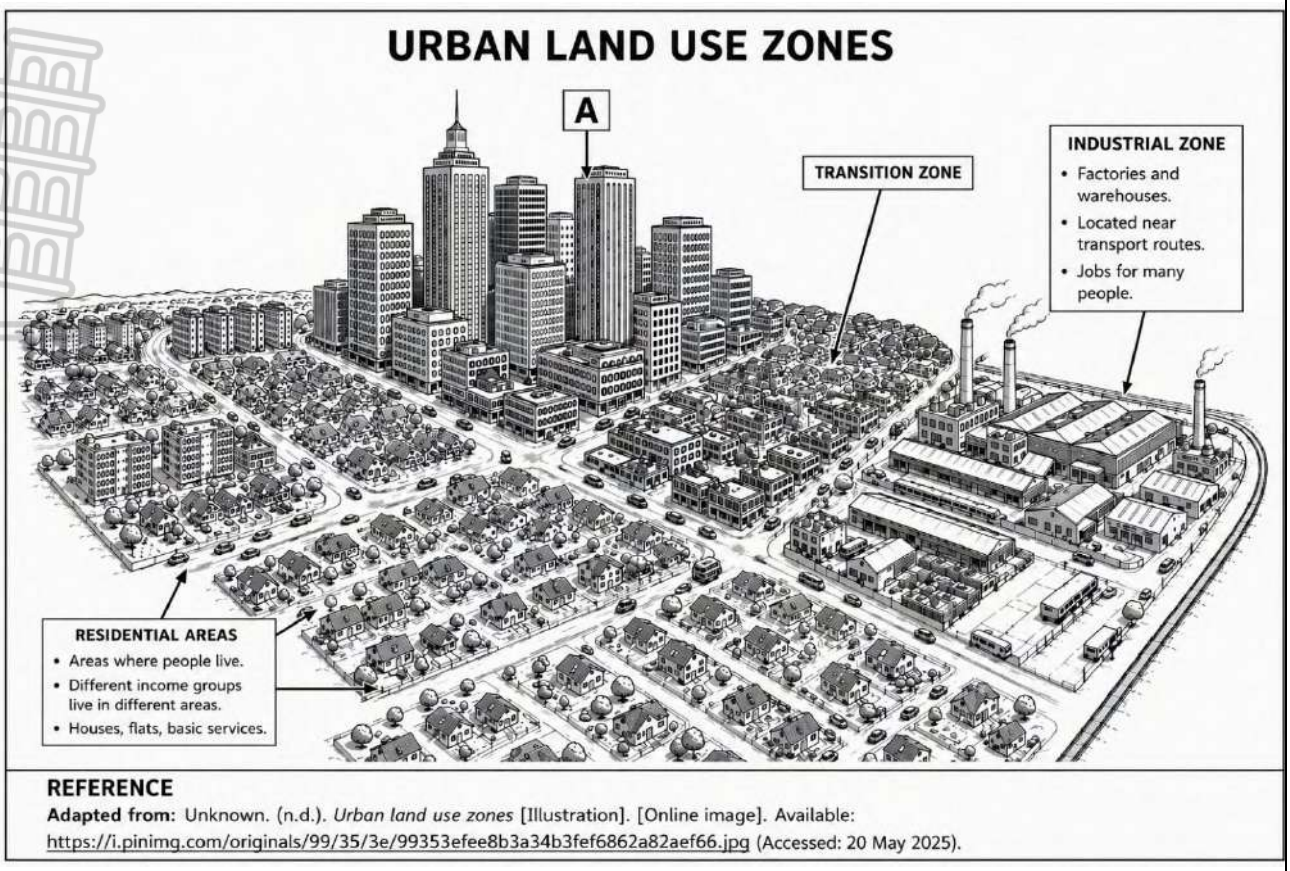


	CHARACTERISTICS	ADVANTAGES	DISADVANTAGES
HIGH DENSITY HOUSING	• Multi-story buildings • Shared amenities (parks, pools) • Close proximity • Urban location	• Walkable (less car use) • Efficient land use • Access to culture/shops • Sense of community	• Congestion / Traffic • Higher costs per sq/ft • Noise pollution • Less private outdoor space
LOW DENSITY HOUSING	• Single-family homes • Detached structures • Suburban location • Private yards	• Large private space • Quiet / Peaceful • Lower costs per sq/ft (property) • Easier to personalize	• Car dependency • Urban sprawl • Urban sprawl • Reduced social interaction • Less efficient land/resource use

[Source: https://share.gemini.google/YVgyYThpTnPP]

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3.6 Refer to the diagram on land use zones.



3.6.1	Name the urban land-use zone labelled **A**.	(1 x 1)	(1)
3.6.2	Give TWO characteristics of the land-use zone labelled **A**.	(2 x 1)	(2)
3.6.3	Explain TWO reasons why land values are high in the CBD.	(2 x 2)	(4)
3.6.4	Discuss TWO problems experienced in the transition zone.	(2 x 2)	(4)
3.6.5	Suggest TWO strategies that municipalities can use to improve conditions in the transition zone.	(2 x 2)	(4)

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1. Urban blight /Urban decay

- *Refers to the deterioration of parts of an urban area.*
- Occurs mainly in the transition zone.



[Adapted from https://the-southern-cross.com/awordortwo/wp-content/uploads/2024/08/w-Graffiti-P11005124.jpg]

Causes of urban blight

- Owners not maintaining buildings
- Graffiti and old paint
- Protests (break windows etc)
- Littering/ poor waste management
- Poor service delivery e.g. roads
- Mixed land uses

Impact of urban blight

- Illegal occupation of buildings
- Attracts low-income immigrants
- Social ills: crime, human trafficking, drugs, street kids
- Land & air pollution (odours)
- Decrease in property values

Possible solutions to urban blight

- ***Invasion & succession***- replacing original function with a new one.
- ***Gentrification***- wealthy people buy low-cost houses & modernise them.
- ***Facadism***- preserving front of buildings & demolish the rest & rebuilt.
- ***Urban renewal***- includes renovation of old buildings.
  - Advantages: employment, improved quality of life, investment, aesthetic appeal
  - Disadvantages: unaffordability to rentals, homelessness, service delivery costs.

1. Traffic congestion

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- *Refers to too many vehicles on the road such that traffic flow becomes virtually standstill.*



[Source: https://www.enca.com/sites/default/files/2025-04/ED_553813.jpg]

Causes of traffic congestion

- Narrow streets
- Grid iron street pattern/plan
- Daily commuting
- Influx of mini buses/ private cars
- Expensive parking
- Inefficient transport system

Impact of Traffic congestion

- Accidents
- Late at work/school / stress
- Road rage, smash & grab incidents
- Damaged car parts
- Air pollution/ oil spillage
- Urban heat island/ climate change

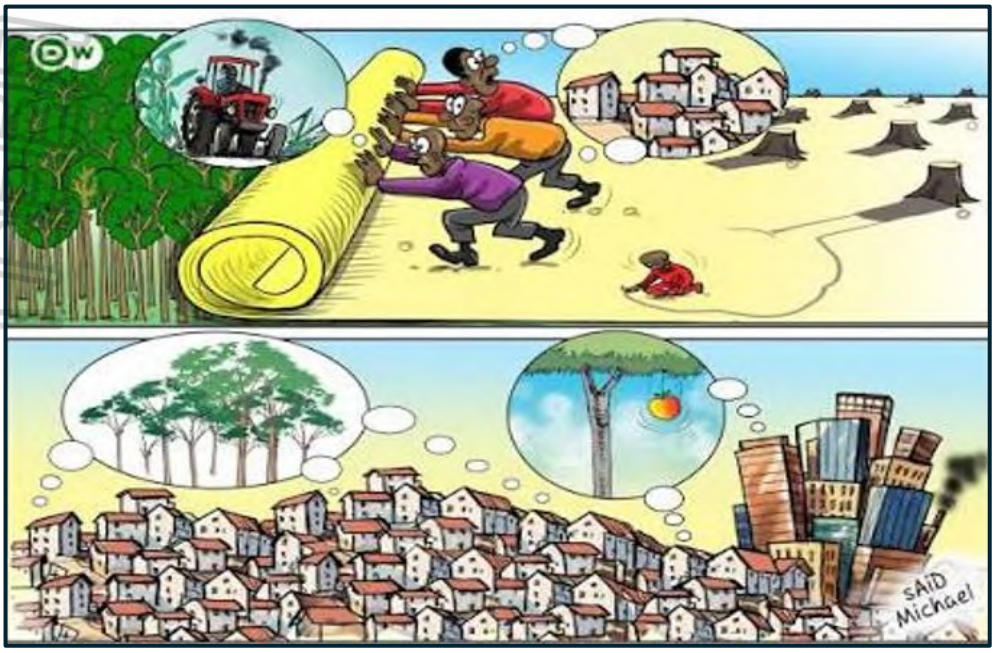
Possible solutions to traffic congestion

- Synchronizing robots/traffic lights.
- Park and ride facilities.
- Charging cars entering the CBD.
- Use of viable public transport system e.g. trains, buses.
- Use of one-way streets.
- Strict monitoring of vehicles i.e. inspection by traffic cops for road worthiness.
- Decentralisation of commercial functions.
- Implementing cycle lanes.

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2. Urban sprawl

❖ *Refers to the uncontrollable/formless expansion of urban areas.*



[Source: https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcT2MO_2MFJjJcd1Uz2DjqBfo8Ea3iM3mS1rVLw34Syofuyj7e6bkCw7QnuV&s=10]

Causes of urban sprawl

- ❖ Lack of urban planning
- ❖ Population growth
- ❖ Urbanisation

Impact of urban sprawl

- ❖ Deforestation
- ❖ Air pollution (construction)
- ❖ Destruction of animals & plants
- ❖ Destruction of habitats
- ❖ Siltation of dams/rivers
- ❖ Soil erosion
- ❖ Loss of agricultural land

Possible solutions to urban sprawl

- ❖ ***Urban consolidation***- increasing building density by building tall buildings.
- ❖ ***New towns***- towns built outside from the main city to prevent formless growth of cities
- ❖ ***Greenbelts***-serve as buffer zone (protecting green areas)
  - ➢ Other advantages: aesthetical appeal, control greenhouse gases, reduces urban heat island, reduces soil erosion, muffles city noise, habitat for living organisms, act as green lungs.
  - ➢

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1. Informal settlements

- *Refers to illegally built settlements made up by a variety of materials such as plastics, cardboards etc.*



[Adapted from https://groundup.org.za/media/uploads/images/photographers/Peter%20Luhanga/illegalconnection1.jpeg]

Why more growth of informal settlements?

- Built by the poor (cannot afford formal housing).
- Dominated by people who are unemployed.
- People use variety of material because they are accessible & cheap.

Issues associated with informal settlements

- High building density-spread diseases
- Illegal electricity-fire hazard
- Plastics & cardboards- flammable
- Lack basic services (clean water, legal electricity, proper sanitation)
- No street names (inaccessibility)
- High crime (impedes service delivery)

Strategies to address issues associated with informal settlements

- Provision of proper building material e.g. bricks etc.
- Upgrading to proper housing (RDP).
- Provision of basic services (piped clean water, sanitation, legal electricity, etc.)
- Improving infrastructure such as road.
- Provision of jobs/ formal employment.
- Upskilling people to venture into entrepreneurship.
- Provision of emergency services e.g. mobile clinics.

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Injustice issues in urban areas

- *Economic injustice refers to unequal access to money, jobs and access to opportunities.*
  - *Examples: poverty, poor public transport etc.*

- *Social injustice refers to unequal access to services and resources*
  - Examples: unequal access to services and resources such as lack of housing, lack of electricity, lack roads, lack of clinics, lack of schools (people end up protesting for these services).

- *Environmental injustice refers to the unfair treatment or abuse of the environment through people's action.*
  - *Examples: air pollution, noise pollution, destruction of ecosystems*

Demonstration of environmental injustice



[Source: https://share.gemini.google/FzRJxmEy3M9i]

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3.7 Refer to the article on urban blight.

URBAN BLIGHT AND THE ECONOMY OF CAPE TOWN

Urban blight in parts of Cape Town is costing the city both money and opportunity. Dilapidated buildings and illegal dumping discourage tourists and investors from key areas. If left unchecked, urban blight will continue to widen inequality by keeping struggling neighbourhoods trapped in a cycle of poverty and economic decline. [Source: www.capetown.gov.za]



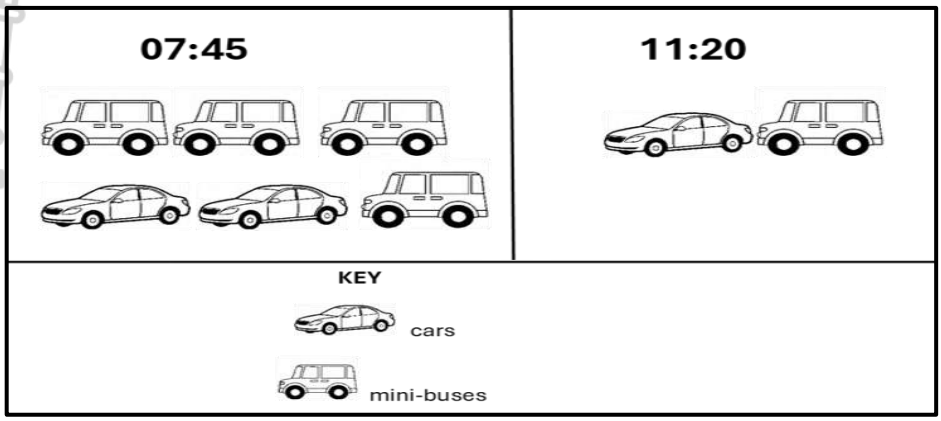
[Source: https://share.gemini.google/JLt8CuSehjwr]

3.7.1	Define the concept *urban blight*.	(1 x 2)	(2)
3.7.2	Mention the land use zone where urban blight usually occurs.	(1 x 1)	(1)
3.7.3	Identify ONE building-related problem from the text that discourages tourist from investing in Cape Town.	(1 x 1)	(1)
3.7.4	Why does the problem identified in QUESTION 3.7.3 happen?	(1 x 2)	(2)
3.7.5	Name one advantage of the trees from the photograph.	(1 x 1)	(1)
3.7.6	In a paragraph of approximately EIGHT lines suggest solutions to each of the problems (from the photograph) associated with urban blight.	(4 x 2)	(8)

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3.8 Refer to the pictograph and the photograph on traffic congestion.

PICTOGRAPH



[Adapted from https://encrypted-tbn0.gstatic.com/images?q=tbn]

PHOTOGRAPH



[Source: https://share.gemini.google]

Downloaded from Stanmorephysics.com

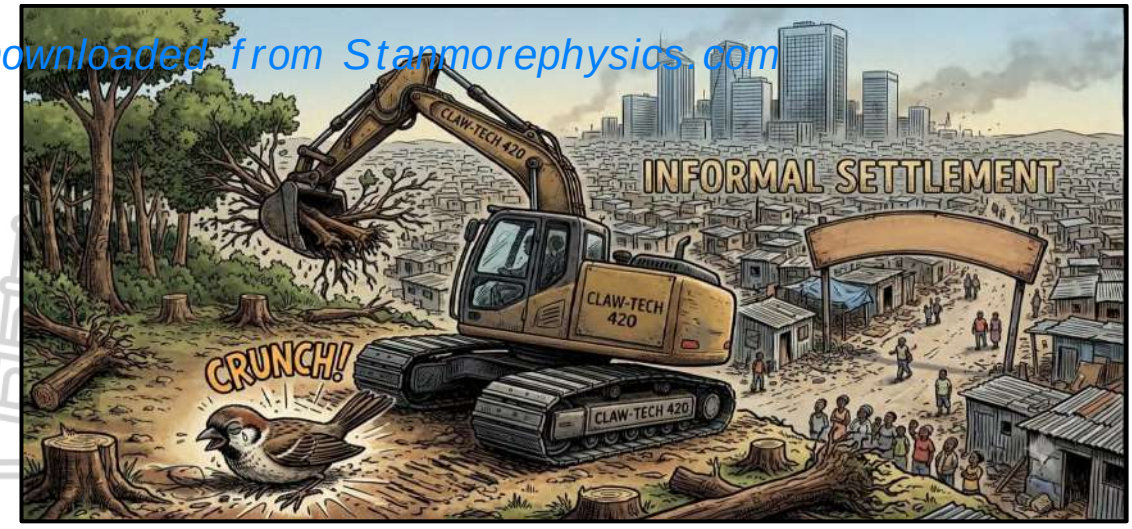
3.9 Refer to the cartoon below on urban sprawl.



[Source: https://share.gemini.google/Pq5T6qR8bFJF]

3.8.1	During which time of the day was traffic congestion the lowest?	(1 x 1)	(1)
3.8.2	With reference to the pictograph, which mode of transport (cars or mini-buses) was most used at 07:45.	(1 x 1)	(1)
3.8.3	Explain ONE possible reason for your answer to QUESTION 3.8.2.	(1 x 2)	(2)
3.8.4	What evidence in the photograph suggests that traffic congestion is taking place?	(1 x 1)	(1)
3.8.5	Explain how the grid-iron street pattern contributes to traffic congestion.	(1 x 2)	(2)
3.8.6	Evaluate the negative impacts of traffic congestion on the local economy of a city.	(2 x 2)	(4)
3.8.7	Suggest TWO strategies that can be implemented to reduce traffic congestion in a city.	(2 x 2)	(4)

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[Source: https://share.gemini.google/Pq5T6qR8bFJF]

3.9.1	Define the concept *urban sprawl*.	(1 x 2)	(2)
3.9.2	Provide ONE piece of evidence from the cartoon that shows the city is expanding uncontrollably.	(1 x 1)	(1)
3.9.3	Explain TWO causes of urban sprawl.	(2 x 2)	(4)
3.9.4	With the aid of the cartoon, discuss in a paragraph of approximately EIGHT lines the negative impacts of urban sprawl on the natural environment.	(4 x 2)	(8)

3.10 Refer to the infographic on informal settlement.

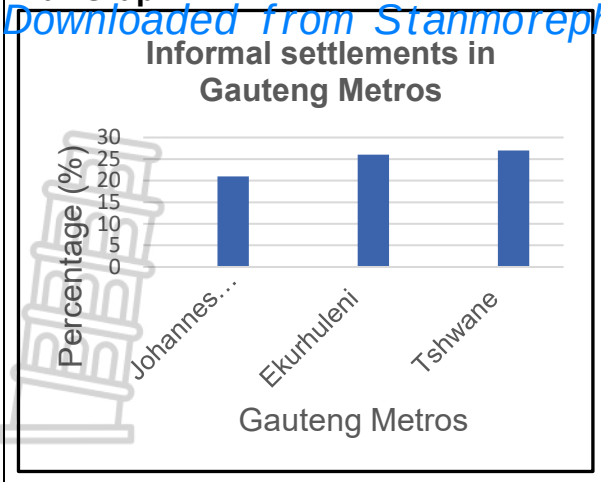
INFORMAL SETTLEMENTS IN GAUTENG

Gauteng, South Africa's most populous province, faces rapid growth of informal settlements as people migrate to cities like Johannesburg, Tshwane and Ekurhuleni for jobs. Over 20% of residents in the Gauteng metros live in informal settlement, putting pressure on least available basic services.

[Source: General Household Survey 2019]

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Bar Graph



General Household Survey, 2019

An Informal Settlement



[Source: https://share.gemini.google/5IMg7AwGT0mA]]

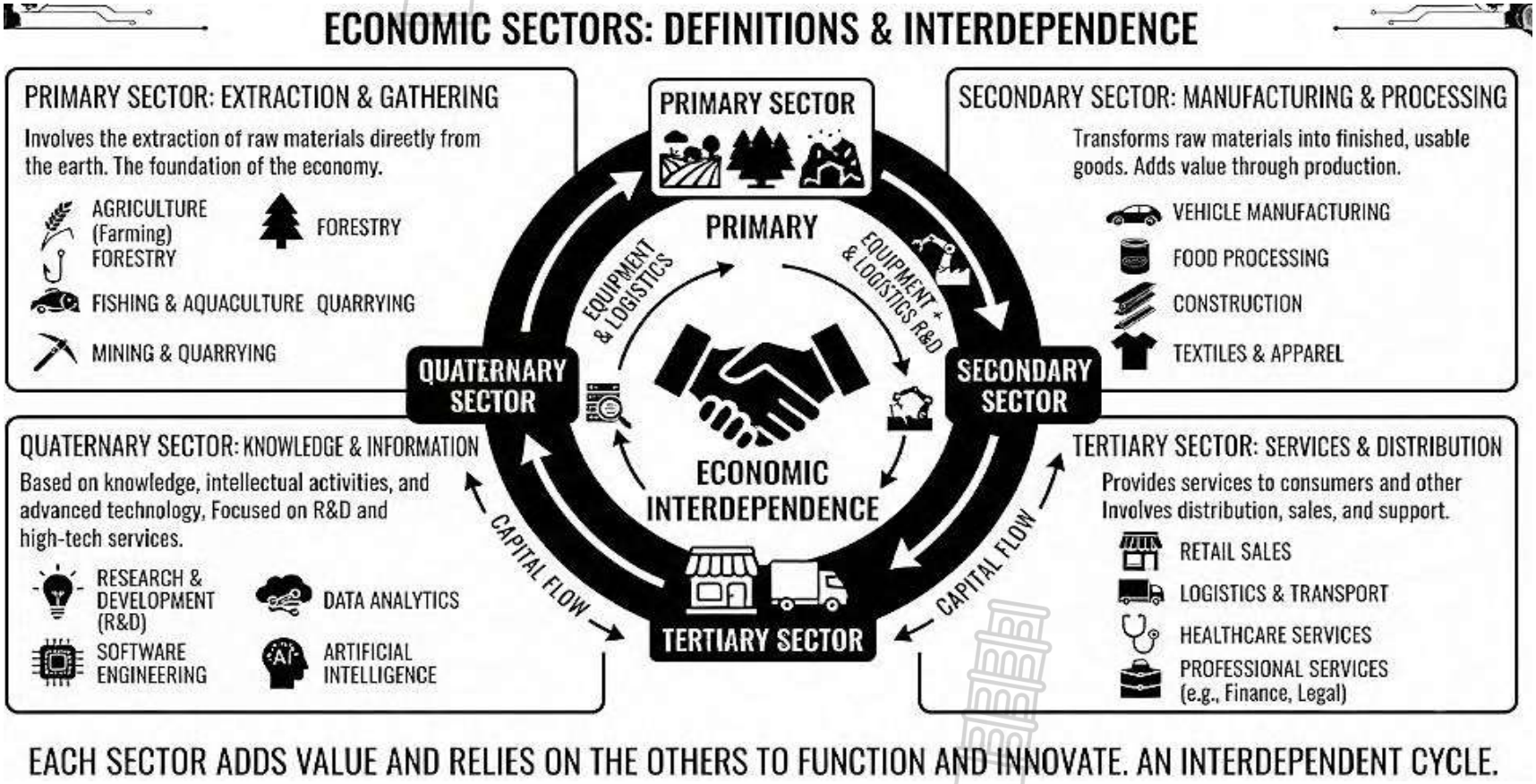
3.10.1	Define *informal settlement*.	(1 x 2)	(2)
3.10.2	According to the text, why do people in Gauteng end up living in informal settlements?	(1 x 1)	(1)
3.10.3	State the percentage of people who live in Tshwane.	(1 x 1)	(1)

Refer to the photograph of the informal settlement.

3.10.4	Give ONE characteristic of the informal settlement as shown.	(1 x 1)	(1)
3.10.5	Why do people use a variety of building material for informal settlements?	(1 x 2)	(2)
3.10.6	Explain ONE health risk that the river poses to people living in the informal settlement.	(1 x 2)	(2)
3.10.7	Suggest THREE ways in which the living conditions in the informal settlement shown could be improved.	(3 x 2)	(6)

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ECONOMIC GEOGRAPHY OF SOUTH AFRICA: THE STRUCTURE OF THE ECONOMY
The economy is divided into FOUR main economic sectors:



[Source: Examiner's own sketch]

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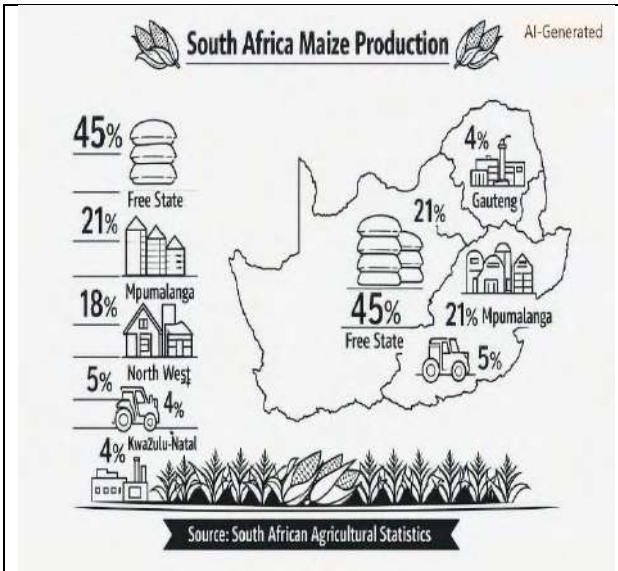
PRIMARY ECONOMIC SECTOR

MAIZE FARMING



[Source:witbank-south-africa-may-commercial-maize-farming-africa-commercial-maize-farming-africa-138010778.jpg (1600×953)]

Maize is South Africa's most widely grown field crop and a national staple food. Both white and yellow maize are cultivated, with white maize mainly used for human consumption and yellow maize for animal feed.



[Source: main maize producing regions in sa - Search]

Areas of Production

- Free State: The largest maize-producing province, contributing approximately 45% of South Africa's commercial maize production.
- Mpumalanga: The second-largest producer, accounting for about 21% of total production.
- North West: Produces around 18% of the country's maize.
- KwaZulu-Natal: Contributes roughly 5% of total maize production.
- Gauteng: Produces about 4% of maize

FACTORS FAVOURING AND HINDERING MAIZE FARMING IN SOUTH AFRICA

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FACTORS FAVOURING	FACTORS HINDERING
➢ The relatively high summer temperatures are suitable for the cultivation of maize. ➢ Availability of flat land allows for use of machinery. ➢ Summer rainfall increases availability of water for irrigation. ➢ Well-developed transport infrastructure allows efficient transportation of maize. ➢ Availability of large labour supply increase production. ➢ Large sums of money are invested by governments on research and agricultural education to increase productivity.	➢ Soils are of poor quality especially where the slopes are steep as increased runoff accelerates soil erosion. ➢ High prevalence of HIV and Aids lowers production on farms as valuable farming skills are lost due to ill health and death. ➢ Low and unreliable rainfall reduces availability of water for irrigation. ➢ Poor soil quality due to soil erosion ➢ Pests and diseases destroy crops, leading to low yields. ➢ Labour strikes and protests decrease production of maize. ➢ Cheaper imports from other countries affect local producers. ➢ Limited access to finance for subsistence farmers.

CONTRIBUTION OF MAIZE FAMING TO THE ECONOMY OF SOUTH AFRICA

- The need to import food from other countries at high costs is reduced.
- Farmers pay taxes to the receiver of revenue which is used to develop the country.
- Raw materials are supplied to industries thus stimulating industrial development
- Maize farming contributes to the GDP of the country through selling of maize
- South Africa earns foreign exchange by exporting maize to other countries.
- Maize farming increase revenue collection for the country.
- The mechanisation of maize has resulted in large-scale on the job training of labours.
- Creates employment which increases buying power.
- Maize farming attracts local and foreign investments.

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4.1 Refer to the extract below on maize farming in South Africa

Maize Farming in South Africa

In 2021/22, South Africa was the ninth largest producer of maize (also known as "mealies" and corn) in the world, and the largest maize producer in Africa. The country produces around 14 million tons of maize per year, of which around 12 million tons are white maize and 2 million tons are yellow maize. South Africa has a long tradition of maize farming, and the crop is well-suited to the climate and soils found here. Maize (also known as "mealies") is grown in all provinces of the country, with the majority of maize in 2020/21 being produced in the Free State, Mpumalanga and the North West provinces.

It is one of the most important crops in South Africa, as it is the main source of food for millions of people. The majority of maize produced in South Africa is used for human consumption, while a smaller percentage is used for animal feed and other industrial uses. Maize farming in South Africa is dominated by large commercial farmers, who produce the majority of the country's maize crop. However, there are also many small-scale farmers, who produce a significant proportion of the country's maize. There are more than 10 000 small-scale and commercial farmers growing maize in South Africa. The majority of these growers are located in the central and eastern parts of the country, where the climate is conducive to maize production.

Source: https://www.adama.com/south-africa/en/maize-farming/maize-farming-south-africa

4.1.1	According to the extract which provinces produced most maize in 2020/21.	(2 x 1)	(2)
4.1.2	According to the extract, how many tons of maize are produced in a country per annum?	(1 x 1)	(1)
4.1.3	Explain how transport infrastructure promotes maize farming in South Africa?	(1 x 2)	(2)
4.1.4	What is small scale farming?	(1 x 2)	(2)
4.1.5	Comment on the contribution that small-scale farmers have on the economy of South Africa.	(2 x 2)	(4)
4.1.6	Suggest possible strategies that South African government could adopt to ensure a stable production of maize	(2 x 2)	(4)

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FOOD SECURITY



[Source: - food security - Search Images]

- **Food security** is when all people have access to enough, nutritious food on regular bases.
- **Food insecurity** is when people do not have access to enough nutritious food on regular bases.

IMPORTANCE OF FOOD SECURITY

- Food security strengthens social stability and economic development.
- Communities with reliable access to food experience better health, higher productivity, and stronger social cohesion.
- To boost immune system and prevent diseases.

FACTORS INFLUENCING FOOD SECURITY IN SOUTH AFRICA

POSITIVE FACTORS

- Greater variety of crops can be planted due to different climatic regions in South Africa.
- Government incentives to small scale farmers.
- Land re-distribution programme is helping people to get more land for farming.
- Improved trade relations
- Planting genetically modified seeds.
- Planting variety of crops to prevent soil exhaustion
- Early warning systems for food crises and disaster response plans.
- Effective storage, transport, and distribution systems to prevent post-harvest losses and ensure timely delivery.

NEGATIVE FACTORS

- Changes in weather patterns, such as increased temperatures and extreme weather events (droughts, floods), disrupt agricultural production.
- Wars and political unrest can disrupt food production and distribution, leading to shortages and increased prices.
- Economic slowdowns can lead to job losses and reduced incomes, exacerbating food insecurity.
- Thin and infertile soils in most regions of South Africa make farming difficult.
- High food prices make it unaffordable since people are not employed.
- Pests and diseases decrease food production in farms.

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STRATEGIES TO IMPROVE FOOD SECURITY

- Incentives can increase productivity on farms.
- Technical support for small scale farmers will increase production.
- Providing modernized farming equipment will increase production.
- Encourage (incentives) subsistence farmers (fragmented land) to embrace commercial farming.
- Incentives for co-operative farming will increase the variety and quantity of products.
- Research into a variety of farming practices will optimize production.
- Land reform programs should be prioritized to give more people access to farming land.
- Subsidizing farmers with the procurement of genetically modified (GM) crops will guarantee production of crops.
- Programs to upskill farmers will improve efficiency and protect the land.
- Access to pesticides and insecticides improve and ensure the quality of crops

4.2 Refer to the extract below on food security crisis for South Africa.



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Although considerably lower than over two decades ago, a large percentage of the South African population continues to struggle with food insecurity – and the numbers have been rising every year since 2019. In 2023, an estimated 15% of the country's population (~9.34 million) experience hunger, while over one-quarter of households experience worryingly complex access to food. This was outlined in the recent General Household Survey by Stats SA. The data reveals a pattern of fluctuating food security. In 2002, the percentage of individuals experiencing hunger was reported at 29.3%. By 2019, this rate had significantly decreased to 11.1%, indicating an improvement. Nevertheless, subsequent years have shown a reversal in this trend, with the hunger rate increasing to 15% by 2023.

[Source: https://businesstech.co.za/news/lifestyle/773531/food-security-crisis-for-south-africa/]

4.2.1	Define the term '*food security*' [Concept]	(1 x 2)	(2)
4.2.2	Describe the trend from 2019 to 2023 regarding country's population that experience hunger.	(1 x 1)	(1)
4.2.3	Explain TWO physical factors that negatively impact on South Africa's food production.	(2 x 2)	(4)
4.2.4	In a paragraph of approximately EIGHT lines, discuss ways to improve food security in South Africa.	(4 x 2)	(8)

PLATINUM MINING IN SOUTH AFRICA



[Source: platinum mines - Search Images]

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South Africa is the world's leading platinum producer, hosting over 80% of global platinum group metal (PGM) reserves, with major operations concentrated in the Bushveld Complex and key mines such as Impala Platinum, Anglo Mogalakwena, and Bathope.

AREAS OF PRODUCTION

Platinum in South Africa is primarily mined in the Limpopo, North West, and Mpumalanga provinces, concentrated within the Bushveld Igneous Complex.

FACTORS FAVOURING AND HINDERING PLATINUM MINING IN SOUTH AFRICA

FACTORS FAVOURING	FACTORS HINDERING
➢ Rock layers have a low thermal gradient; therefore, less cost is incurred in having to cool the air using fans. ➢ Large platinum reserves in the bushveld complex. ➢ High global demand for platinum ➢ Well-developed transport infrastructure such as roads and railways to transport platinum to sea ports. ➢ Large labor force (skilled and unskilled) increases production of platinum. ➢ Low geothermal gradient reduces cooling costs.	➢ Mines are situated inland therefore the cost of transporting the minerals to the coast is high. ➢ HIV/AIDS has resulted in many skilled workers being lost in this pandemic. ➢ Fluctuation in the price of platinum. ➢ Labor strikes and wage disputes can stop production (Marikana strike) ➢ Strict environmental regulations since platinum mining damage the environment. ➢ High taxes are paid on profits ➢ Decrease in foreign investments due to labor strikes. Talks of nationalizing mines bring uncertainty to potential investors.

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CONTRIBUTION OF PLATINUM MINING TO THE ECONOMY OF SOUTH AFRICA

- Foreign income is earned from exporting platinum.
- Mining companies pay taxes to the receiver of revenue thus stimulating the growth rate of the country.
- Mining contributes to the socio-economic development of the country.
- Mining has led to development of infrastructure in the country.
- Roads and railway lines have been developed to transport minerals, mining equipment, and people.
- Mining contributes to socio-economic development of the country through creating employment opportunities.
- Mining in South Africa has led to rapid urbanisation in the country.
- Promote growth of small businesses in local communities
- Platinum mining attracts local and foreign investors.

ACTIVITY 4.3

Refer to the extract below on platinum production in SA

In South Africa, the discovery of the first platinum nuggets dates back to 1924. The geologist Hans Merensky's follow-up work resulted in the discovery of two deposits, each around 100km in length, which became known as the Bushveld Igneous Complex. This discovery started with test work in the area around Mashishing (formerly known as Lydenburg). Based on successive encouraging findings, Merensky approached a circle of friends to raise funds to investigate any payable platinum deposits. He used the farm Maandagshoek as a base and later secured 23 claims and worked quickly to locate other platinum occurrences in the area. Merensky's work resulted in the naming of the Merensky reef. In 1925 follow-up work resulted in the identification of the eastern limb of the Bushveld Complex.

The mines on this geological structure have for many years produced more than 75% of the world's output. Since World War 2, platinum mine production has grown continuously in response to new applications being developed for the metals. A significant new use of platinum was in the petroleum industry where platinum catalysts were introduced to increase the octane rating of petroleum and to manufacture important primary feedstocks for the growing plastics industry. This was followed in the 1960s by growing demand for platinum jewellery – given its purity, color, prestige and value.

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4.3.1	According to the extract, in which year was platinum discovered?	(1 x 1)	(1)
4.3.2	Identify TWO uses of platinum from the extract.	(2 x 1)	(2)
4.3.3	"There is a growing demand for platinum": Discuss how this can lead to economic growth in South Africa?	(3 x 2)	(6)
4.3.4	Discuss factors that might threaten the growth of platinum mining in future.	(3 x 2)	(6)

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SECONDARY SECTOR

Secondary sector refers to processing and manufacturing of raw material into value added products.

- Examples: fruit canning, metal processing, construction, ship building etc.

CONTRIBUTION SECONDARY SECTOR TO THE SOUTH AFRICAN ECONOMY

- Contributes to GDP- money is generated in the form of taxes
- Brings foreign capital.
- Creates employment opportunities, improving standard of living of people.
- Brings foreign investments.
- Stimulate economic growth
- Stimulates infrastructural development.

LIGHT AND HEAVY INDUSTRIES

Light industry



Visit-Your-Shoe-Manufacturers-Factory.webp (800×533)

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Heavy industry



[Source: power-station.jpg (612×408]

Heavy industries	**Light industries**
Process bulky raw materials	Process small quantity of raw material.
Cause a lot of air and noise pollution	Little pollution or no pollution
Highly incompatible with the CBD and high-income residential zone	Compatible with the CBD and high-income residential zone
Require break of bulk transport	Use road transport
Occupy large piece of cheap flat land	Occupy small piece of land

TYPES OF INDUSTRIES

- **RAW MATERIAL ORIENTATED INDUSTRY**
  - These industries locate close to the source of raw material they process.
  - This is usually because they process bulky raw material.
  - They locate close to raw material to reduce transport costs.

- **MARKET ORIENTATED INDUSTRY**
  - These industries locate close to the customers.
  - This is usually because the products are perishable and need to be sold relatively fresh.

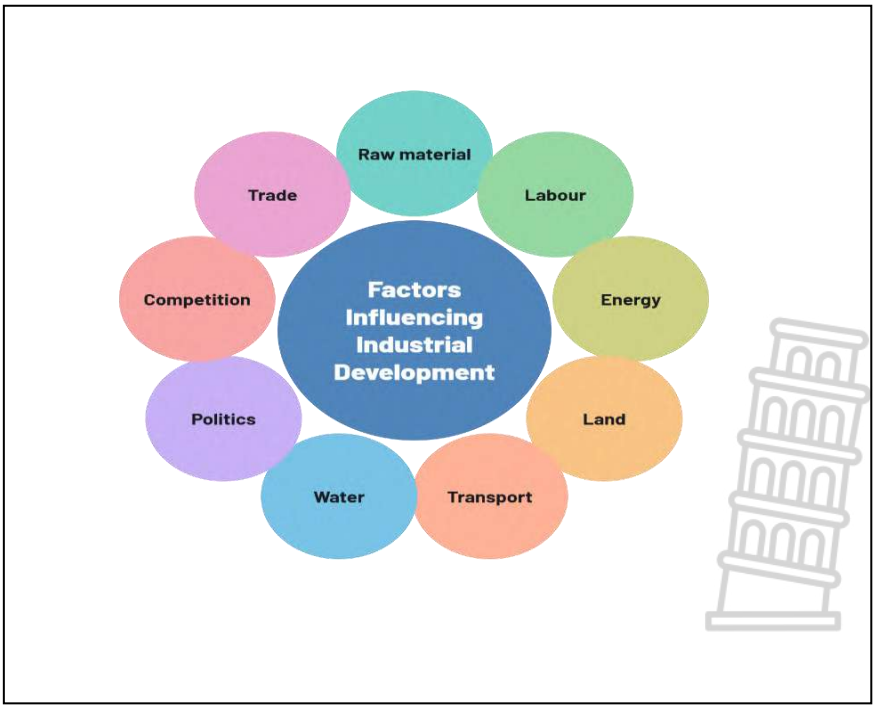
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- **FOOTLOOSE INDUSTRY**
  - These industries can be located anywhere without effect of any factors.
  - It is service orientated and highly skilled people work in this industry.
  - It does not require any raw material.

- **UBIQUITOUS INDUSTRY**
  - These industries can be found everywhere; they do not need to be near raw material or market.
  - They are not found in any specific geographic location

- **BRIDGE INDUSTRY/ BREAK-OF-BULK INDUSTRY**
  - Located between source of raw materials and customers/market, where goods are transferred from one mode of transport to another.

FACTORS THAT FAVOUR INDUSTRIAL DEVELOPMENT IN SOUTH AFRICA



factors that favour location of industries in south africa - Search Images

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ECONOMIC FACTORS

- **Trade / Market**
  - Access to local and international market allows industries to export products and grow revenue.
  - High population increases a demand for finished goods.

- **Energy Supply**
  - Availability of coal ensures adequate supply of power.

- **Infrastructure**
  - Good railway and road transport infrastructure is available in South Africa.
  - Presence of harbours and airports provide international links.

PHYSICAL FACTORS

- **Flat land**
  - Level terrain (flat land/gentle slope) makes it easier and cheaper to construct factories
  - Increases accessibility, reducing transport costs.

- **Raw material**
  - Variety of raw material is readily available.
  - Access to minerals, agricultural produce and other raw materials lowers production costs.

- **Water**
  - A reliable water supply supports processing industries and help with cooling of machines in industries.

SOCIAL FACTORS

- **Labour**
  - Both skilled and unskilled labour are available, especially in densely populated core regions, reducing recruitment costs for industries.

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POLITICAL FACTORS

- **Government support and incentives**
  - Strategies such as Industrial Development zones (IDZs), Spatial Development Initiatives (SDI) offer tax incentives that attract investment.

- **Political intervention**
  - Government has laws and policies which support local industries to grow.

FACTORS THAT HINDER INDUSTRIAL DEVELOPMENT IN SOUTH AFRICA

ECONOMIC FACTORS

- **Transport**
  - A shift from railway transport to road transport has made transporting of goods expensive.
  - The railway lines are not sufficient.
  - Cable theft of power lines cause delay of transported goods.
  - Large distance from Gauteng industrial region to the harbours increases transport costs.

- **Competition**
  - Competition from cheaper imported products can destroy local industries
  - Counterfeit products are much cheaper decreasing the market for genuine products.

- **Trade**
  - Trade restrictions and taxes on imports to SA and exports to other countries lead to lower profits.
- **Energy supply**
  - Load shedding results in unreliable electricity supply.
  - The price of electricity is increasing at a high rate.

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PHYSICAL FACTORS

- **Water supply**
  - South Africa has low and unreliable rainfall resulting in water scarcity.
  - Companies need a permit from government to use a certain amount of water which limits the capacity to produce goods.

SOCIAL FACTORS

- **Labour supply**
  - There is a shortage of skilled labour force increases production costs as some skills will have to be imported.
  - Labour strikes and labour disputes decrease production in companies.

POLITICAL FACTORS

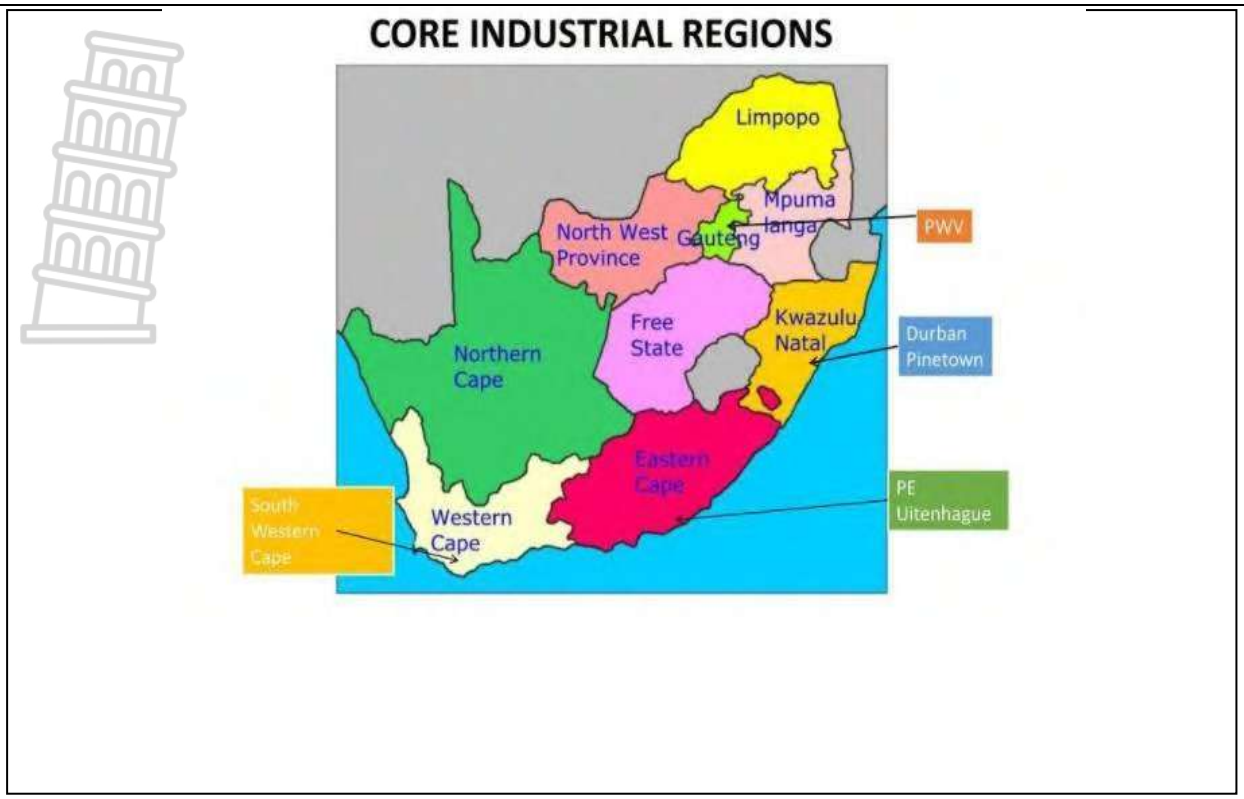
- **Political interference**
  - It leads to heavy taxation and restrictions which prevent foreign investment and further development.

FOUR INDUSTRIAL REGIONS OF SOUTH AFRICA

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1. PWV/Gauteng
2. Durban-Pinetown / eThekwini
3. South Western Cape
4. Port Elizabeth-Uitenhage / Nelson Mandela Bay

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PWV/GAUTENG

- **Main industries**
  - Iron and steel (main industry)
  - Chemical
  - Metal processing
  - Explosives

- **Factors favouring industrial development in PWV/GAUTENG**
  - It has good roads, railway transport facilities and international airport.
  - It is densely populated resulting in abundant skilled and unskilled labour force available.
  - Availability of variety of mineral resources (raw materials)
  - Has large market due to high dense population
  - Relatively flat land
  - Reliable supply of coal ensures constant supply of energy

- **Factors hindering industrial development in PWV/GAUTENG**
  - Labour strikes and protests decrease production
  - Traffic congestion delays deliveries.
  - Strain on resources e.g. water supply and electricity supply
  - Distance to the harbour increases transport costs.
  - Create a lot of air pollution.

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PORT ELIZABETH-UITENHAGE

- **Main industries**
  - Motor vehicle assembly and components
  - Tyre manufacturing
  - Textile and footwear (leather goods)
  - Agro-processing (fruit and food canning)
  - Ship repair and port-related industries

- **Factors favouring industrial development in PORT ELIZABETH-UITENHAGE**
  - Deep-water harbour (Port of Coega and Port Elizabeth harbour) for imports/exports
  - Good road and rail links to the rest of the country.
  - Access to raw materials from the agricultural hinterland (fruit, wool, hides).
  - Skilled labour supplied by local universities and colleges.
  - Relatively low cost of land compared to Gauteng.

- **Factors hindering industrial development in PORT ELIZABETH-UITENHAGE**
  - Labour strikes and protests decrease production
  - Traffic congestion delays deliveries.
  - Periodic drought and water restrictions in the Eastern Caped
  - Strain on resources e.g. water supply and electricity supply
  - Distance to large Gauteng consumer market increases transport costs.
  - High local unemployment reduces buying power
  - Ageing municipal infrastructure in parts of the region.

SPATIAL DEVELOPMENT INITIATIVE (SDI)

A programme aimed at creating jobs and attracting investments in untapped/underdeveloped areas with high economic growth potential

Wild coast SDI is a government development programme aimed at promoting economic growth along the wild coast of Eastern Cape, which stretches around from East London to the KZN border.
Economic activities dominant in this SDI include tourism, agriculture, fishing and forestry.

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Wild Coast SDI



Source: [Examiner's own sketch]

- **FACTORS FAVOURING DEVELOMENT**
  - The area has beautiful beaches and unspoilt coastline.
  - Rich in natural scenery and biodiversity
  - The area has a strong tourism potential
  - Unique cultural heritage which attract tourists
  - Close proximity to major markets such as Gqeberha and Durban.

FACTORS HINDERING DEVELOMENT

- Poor infrastructure in some areas
- High levels of poverty and unemployment in local communities
- Lack of investments in this region
- Concerns about environmental conservation.
- Sand mining increase pollution.

ECONOMIC IMPORTANCE

- South Africa earns foreign exchange as many tourists visit this region.
- Attract local and foreign direct investments
- Promote development of world class industrial infrastructure.
- Promote access to international market
- Creation of employment opportunities to which increase buying power.
- Promote the tourism industry as transport infrastructure is

SOCIAL IMPACT

- Improves the standard living for local people
- Increase earning potential and reduce poverty
- Stimulate the growth of small businesses in local communities.
- Promote infrastructure development in local communities.
- Promote skills development in local communities.
- Improves service delivery such as water and electricity

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INDUSTRIAL DEVELOPMENT ZONE(IDZ)

Focused industrial development area that creates jobs and promotes exports, close to major transport routes with international links.

- **COEGA IDZ**

➢ It is situated in Port Elizabeth (Eastern Cape Province)

➢ Aim to attract local and foreign investment while creating employment opportunities

- **MAIN INDUSTRIES**

➢ Automotive

➢ Agro -processing

➢ Textile

Factors that favour the development of COEGA IDZ ➢ Harbor / Sea port ➢ Market ➢ Labor supply ➢ Water ➢ Flat land	**Factors that hinder the development of COEGA IDZ** ➢ Expensive electricity ➢ Shortage of skilled labor ➢ Labor strike ➢ Drought
Economic impact of the development of COEGA IDZ ➢ Create jobs ➢ Attracts investments ➢ Improve infrastructure ➢ Contribute to the GDP	**Social Impact of the development of COEGA IDZ** ➢ Reduce poverty ➢ Improves standard of living ➢ Improve skills ➢ Reduce crime rate

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COEGA IDZ



The Coega SEZ emerges as a prime location for growing OEMs

4.4.1	What does the abbreviation IDZ stands for?	(1x1)	(1)
4.4.2	In which province is COEGA IDZ located?	(1x1)	(1)
4.4.3	Identify one physical factor that influenced the location of COEGA IDZ	(1x1)	(1)
4.4.4	Discuss the social advantages of COEGA IDZ in this region.	(3x2)	(6)
4.4.5	Explain why the COEGA IDZ would be an attractive location for investment by overseas companies?	(3x2)	(6)

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INFORMAL SECTOR

The sector of economy that consists of unregistered businesses that do not pay income tax.

Reasons for the development of informal sector

- High rate of unemployment.
- Large number of immigrants.
- Lack of skills.
- Retrenchments

Importance of the informal sector.

- Reduce poverty.
- Reduce crime
- Support the formal sector
- Pay VAT
- Create employment

Challenges facing South Africa's informal sector

- Exposed to different weather conditions.
- Harassed by officials.
- Unable to get bank loans.
- Do not have storage facilities / shelter.

Strategies for strengthening the informa sector

- Register their businesses.
- Education and skills training.
- Increase access to bank loans.
- Partnership with informal businesses.
- Provide shelter/ storage facilities.

ACTIVITY 4.4

Refer to the photograph below:



www.joburg.org.za

4.4.1	Give evidence that proves that the diagram represents informal sector.	(1 x 1)	(1)
4.4.2	Identify two challenges faced by people in the informal sector	(2 x 1)	(2)
4.4.3	Why is the informal sector important?	(3 x 2)	(6)
4.4.4	Suggest sustainable strategies that could be implemented to strengthen the informal sector.	(3 x 2)	(6)