



JENN

Training and Consultancy
The path to enlightened education



Province of the
EASTERN CAPE
EDUCATION

SUBJECT: GEOGRAPHY

GRADE 12

2024 LAT PUSH MANUAL

**TEACHER AND LEARNER CONTENT MANUAL
MARKING GUIDELINES**

**Spring school topics
Economic geography**

**Last push activities
Climate and weather
Geomorphology**

Activity 1

- 1.1.1 Goods and services sold to outside countries (1x2) (2)
- 1.1.2 1% (1x1) (1)
- 1.1.3 Foot and mouth disease (1x2) (2)
- 1.1.4 January (1x2) (2)
- 1.1.5
- South African good face tough competition in the foreign market.
 - The outbreak of disease also negatively impacted South Africa's wool exports.
 - Lack of subsidy for most farmers leading to cheaper imports from other countries with subsidies for their farmers
 - Beef products cannot compete well in the international market
 - Unfair trade policies
- (4x2) (8)

Activity 2

- 2.1.1 Food security refers to the availability of well-balanced meals on a regular basis (1x2) (2)
- 2.1.2 11.6% (1x1) (1)
- 2.1.3
- .Population growth
 - Unemployment
 - Poor soils
 - Environmental degradation
 - Uneconomical farm units
 - Government corruption
 - War and conflict
 - Lack of capital to purchase equipment
 - Shift to biofuel production
 - Trade policies
- (Any two) (2x2) (4)
- 2.1.4
- Some households are headed by children they could not report.
 - People do not know the channels of reporting
 - most areas are rural and cannot be easily accessed
- (Any two) (2x2) (4)
- 2.4.5
- Empowering women
 - Planting a variety of crops
 - Diversity of climate regions
 - Sustainable agriculture
 - Land reform programs & land redistribution
 - strong trade relations
 - Diversification of rural economies
 - Processing crops
- (Any two) (2x2) (4)

3.1

3.1.1 A

3.1.2 C

3.1.3 B

3.1.4 D

3.1.5 B

3.1.6 C

3.1.7 C

3.1.8 B

Activity 4

4.1.1 R2 billion (1) (1x1) (1)

4.1.2 2016 - 2018 (2)

4.1.3

- Coal mines are located inland/far from the harbour (2)
- High transport costs due to greater distances to harbour (for export) (2) (1x2) (2)

[ANY ONE]

4.1.4

- Decline in investments' (2)
- 'Disinvestment' (2)
- 'Giant coal mining companies have sold or are in the process of selling their operations' (2)
- 'Environmental lobbying groups' (2)
- 'Moving towards renewable energy' (2)
- 'High transport costs' (2)
- 'Altered customer base' (2)
- 'Hostile funding environment' (2)
- [ANY TWO]

4.1.5

- (Increased) loss of employment opportunities due to decreased production (2)
- (Increased) loss of revenue due to unemployment (2)
- Less contribution due to a reduction in tax collection (2)
- Reduced foreign exchange due to decreased investments (2)
- Limited development of infrastructure due to decrease in production (2)
- Closure of industries/business linked to coal mining (accept examples) (2)
- Smaller local market for goods due to increased unemployment (2)
- Spending power of workers decreases which results in economic sectors being negatively affected (2)

- Increased cost of electricity due to less coal available for generation of power (2)
- Operational costs of industries will increase (2)

[ANY THREE- CANDIDATES MUST QUALIFY RESPONSE]

2.1

- 2.1.1 G
- 2.1.2 D
- 2.1.3 H
- 2.1.4 A
- 2.1.5 B
- 2.1.6 C
- 2.1.7 E

Activity 2.2

- | | | |
|-------|--|-----------|
| 2.2.1 | Pretoria Witwatersrand Vereeniging | (1x1) (1) |
| | | |
| 2.2.2 | <ul style="list-style-type: none"> • Load shedding negatively affects GDP growth • If there is load shedding, there will be no production | (2x1) (2) |
| | | |
| 2.2.3 | <ul style="list-style-type: none"> • long labour strikes, • maintenance and weak domestic and global demand • political uncertainty | (2x1) (2) |
| | | |
| 2.2.4 | <ul style="list-style-type: none"> • technologies depend on supply of energy to function • automated machines can only function if there is electricity | (2x2) (4) |
| | | |
| 2.2.5 | <ul style="list-style-type: none"> • Load shedding will decrease production and people may loose their jobs. • Companies that depend on large enterprises for their products may be forced to shut down if they do not receive their raw materials • GDP of Gauteng will decline as there will be low production. | (3x2) (6) |

Activity 3

2.3.1	South Western Cape	(1x1)	(1)
2.3.2	Kwazulu Natal	(1x2)	(2)
2.3.3	<ul style="list-style-type: none">Well-developed infrastructurehigh levels of employment and educationContributes the most to the agricultural sector– grapes, deciduous fruit, citrus fruit, wheatAlso export fynbos, rooibos, tea and wine.Wool, meat and dairy industries also strong.Good farming systemsHarbour – direct access to export market and to process imported itemsAgulhas bank – great fishing80% urbanised; Africa's Western CityTransport routes good, despite mountainsWater sufficient from inland damsSkilled, semi-skilled, unskilled labourLeisure tourism (Any two)	(2x2)	(4)
2.3.4	<ul style="list-style-type: none">High number of people will be able to earn an incomePeople will be able to afford commodities in householdsThere will be development of infrastructurePeople will be able to afford healthcare	(4x2)	(8)
			(15)

Activity 2.4

2.4.1	15%	(1x1)	(1)
2.4.2	Sea (1) Air (1) Land (1) (Accept examples) [ANY TWO]	(2x1)	(2)
2.4.3	<p>a. Raw materials (accept examples) are available (2) Large skilled and unskilled labour supply (2) Sufficient water supply (2) Specialised transport/infrastructure (for perishable products) (2) Large market (2) Require less space (2) Electricity is available (2) Suitable climate to grow a variety of crops (2) [ANY TWO]</p> <p>b. Lack of /Distance from mineral raw materials (2) Electricity is more expensive (2) No coal for power resources (2) Higher transport costs (2) Unreliable water supply (2) Transport infrastructure not adequate (2)</p>	(2x2)	(4)
		(2x2)	(4)

Limited space for development (2)
[ANY TWO]

- 2.4.4
- West coast SDI links the South-western Cape core industrial region to Saldanha Bay (harbour) which favours exporting (2) (2x2) (4)
 - The deep-water harbour will allow for the international exportation of larger cargo (2)
 - N7 to Namibia allows for international export by road (2)
- [ANY TWO]

Activity 2. 5

- 2.5.1 Total value of goods and services produced in a country in a year (1x2) (2)
- 2.5.2 Primary sector (1x1) (1)
- 2.5.3 Mining (2x1) (2)
Agriculture
- 2.5.4 20.1% (1x2) (2)
- 2.5.6 When the total of imports is greater than that of exports (1x2) (2)
- 2.5.7 Country closed down due to covid
Low demand for buildings
No new construction projects in the year (3x2) (6)

Activity 2.6

- 2.6.1 The shadow economy (1x1) (1)
- 2.6.2 She cannot afford it (1x1) (1)
- 2.6.3 Regular raids (1x1) (1)
Goods are seized
Fines are issued
- 2.6.4 They do not pay taxes to SARS (1x2) (2)
Unregistered businesses
- 2.6.5 It creates jobs (2x2) (4)
Reduces dependence on state
Goods are cheaper
Services are affordable
They buy goods from formal sector
Creation of new skills
They pay VAT
Reduces crime
(Any two)
- 2.6.6 They could reduce taxes (3x2) (6)
Affordable registration fees
Provide access to capital
Skills training
Allow informal businesses to operate from home
Effective policing
Offer affordable rentals of premises
Employment benefits to workers in the informal sector
Partnership between the formal and the informal sectors
Provision of facilities
Provide services

2.7

- 2.7.1 20 (1) % (1x1) (1)
- 2.7.2 Economic recession (accept examples) (1)
Unemployment (accept examples) (1)
Less expensive (1)
Non-payment of additional costs (accept examples) (1)
It is accessible (1)
Make use of informal labourers (1)
[ANY TWO] (1x2) (2)
- 2.7.3 It provides employment opportunities (accept examples) (2)
It reduces government responsibility for providing grants (2)
Demand for goods will increase production (accept examples) (2)
They pay VAT (2)
Access to more affordable goods (2)
Creates economically sustainable (accept examples) entrepreneurial ideas/skills (2)
It provides a bigger market for goods (accept examples) (2)
Goods can be bought at an affordable price (2)
Regular income reduces crime (2)
Contributes to the GDP (2)
[ANY TWO] (2x2) (4)
- 2.7.4 Regulate the sector (accept examples) (2)
Allocate designated areas for them to trade (accept examples) (2)
Supply basic services (accept examples) (2)
Provide infrastructure (accept examples) (2)
Increased security for their goods (2)
Create partnerships with the private sector (accept examples) (2)
Upskilling of entrepreneurs (2)
Access to funding (accept examples) (2)
[ANY FOUR] (2x4) (8)

Last push revision activities

CLIMATOLOGY AND GEOMORPHOLOGY

TOPIC ONE CLIMATOLOGY

1.1

- | | | | |
|-------|--|-------|------------|
| 1.1.1 | Mature (1) | (1X1) | (1) |
| 1.1.2 | A well-developed cold front (2)
Wide spread rainfall to Western Cape/ Affects the Southwestern Cape/made landfall (2)
Well-developed cold sector and warm sector (2)
Presence of the cumulonimbus cloud ahead of the cold front (2)
Steep gradient (2)
[ANY ONE] | (1X2) | <u>(2)</u> |
| 1.1.3 | Driven/steered by the Westerly winds (2)
The mid-latitude cyclones move from west to east (2)
[ANY ONE] | (1X2) | <u>(2)</u> |
| 1.1.4 | Lowest -15 (1) mm
Highest- 40 (1) mm | (1X2) | <u>(2)</u> |
| 1.1.5 | Cold front (cold air) undercuts warm moist air (2)
Resulting in rapid uplift of warm moist air (2)
Rising air cools and condenses (2)
(Extensive/great vertical extent) cumulonimbus clouds develop (2)
[ANY TWO- PROCESSES] | (2X2) | (4) |
| 1.1.6 | Will result in soil erosion (accept examples)(2)
Biodiversity will be destroyed (2)
Destruction of natural habitat (accept examples) (2)
Destruction of natural vegetation (2)
Loss of wildlife (2)
Destruction of food chains /ecosystems/food webs (2)
Will cause mass movements (accept examples) (2)
Fertilisers washed into the rivers (causing eutrophication) (2)
Will result in water pollution (accept examples) (2)
Leaching of soil nutrients (2)
(Low lying) areas are flooded (2)
Waterlogged conditions (saturation of soil) (2)
[ANY TWO] | (2x2) | (4) |

1.2 Refer to the extract below on cold fronts.

1.2.1	Winter (1)	(1 x 1)	<u>(1)</u>
1.2.2	(10/12/13) June /Date (1) Cold fronts in the interior of Western/Eastern Cape (1) High amounts of rainfall (1) Significant drop in temperature (1) [ANY ONE]	(1x1)	<u>(1)</u>
1.2.3	Northward movement of the high pressure belts (anticyclones)/ITCZ	(1x1)	<u>(1)</u>
1.2.4	Backing (1)	(1x1)	(1)
1.2.5	(The wind direction associated with the cold front will) change from north-west to south-west as the front moves over the Western Cape	(1x2)	(2)
1.2.6	Positive: Brings much needed moisture to the soil (2) Revival of biodiversity/ecosystem/habitat (2) Water available for wildlife (2) Water available for growth of natural vegetation (2) Water allows for more grazing land/veld (2) Fill up (by infiltration) natural aquifers/springs/groundwater (2) Fill up (via surface runoff) rivers (2) Negative: (Low-lying) areas are flooded (2) Soil erosion will increase (2) Destruction of biodiversity/ecosystem/habitat (2) Damage to natural vegetation (2) Loss of wildlife (2) Increase salination of rivers (2) Saturation of soil (waterlogged conditions) (2) Rock falls/mass movements on steeper slopes (2) [ANY FOUR, RESPONSES MUST REFER TO BOTH POSITIVES AND NEGATIVES]	(4x2)	(8)
1.3			
1.3.1	Westerlies (1)	(1x1)	(1)
1.3.2	Cold front (1)	(1x1)	(1)
1.3.3	A (1)	(1x1)	(1)
1.3.4	The windspeed behind the cold front is faster (30 knots) (2) The windspeed behind the warm front is slower (10 knots) (2) Ahead of the cold front the air is warmer/less dense/lighter (2) Ahead of the warm front the air is colder/denser/heavier (2) Warm front use energy to move forward and rise (2) The pressure gradient associated with the cold front is steeper (2) [ANY ONE]	(1x2)	(2)
1.3.5	Clockwise circulation of air (2) Position of the low pressure is south of the system (2) Warm sector / Cold front is to the north (2)	(1x2)	(2)

Cold sector / Warm front is to the south (2)
 Backing of the wind occurs (2)
 Apex is to the south (2).
 [ANY ONE]

- 1.3.6 a Z (2) (1x2) (2)
- b The air behind the cold front is colder (10°C) than the cool air in front of the warm front (14°C) (2)
 The cold front symbol is at the apex of the mid-latitude cyclone (2)
 Cold front touches the surface (2)
 Cold front has uplifted the warm front (2)
 Cumulonimbus clouds evident (2)
 [ANY ONE] (1x2) (2)
- c The cold front which is moving faster undercuts/overtakes (✓) the warm front (2)
 The warm air is forced to rise (✓), resulting in the narrowing of the warm sector (2)
 The cool air (in front of the warm front) (✓) is completely uplifted (2x2) (4)

[15]

TROPICAL CYCLONES

1.4

- | | | | |
|-------|--|-------|-------------|
| 1.4.1 | Clockwise movement of air (1)
Position of the leading left quadrant (1)
Wind direction shown by the symbol of the eye (1)
[ANY ONE] | (1x1) | (1) |
| 1.4.2 | Pressure in the centre is significantly below 1000 hPa (1)
Well-developed eye (1)
The area covered by the tropical cyclone is large (450km- 950km) (1)
The leading left quadrant (dangerous semicircle) is visible (1)
Isobars are closely spaced/pressure gradient is very steep (1)
[ANY TWO] | (2x1) | (2) |
| 1.4.3 | There will be no cloud cover/clear skies (2) | (1x2) | (2) |
| 1.4.4 | Descending air heats up resulting in no condensation (2)
Adiabatic heating reduces moisture/becomes dry (2)
[ANY ONE] | (1x2) | (2) |
| 1.4.5 | a Air pressure decrease and wind speed increases (2) | (1x2) | (2) |
| | b Both air pressure and wind speed decreases (2) | (1x2) | (2) |
| 1.4.6 | It experiences the most intense weather conditions (accept examples of severe weather conditions) (2) | (1x2) | (2) |
| 1.4.7 | When the forward movement combines with the rotation of the system | (1x2) | (2)
[15] |

1.5

1.5.1 Presence of Coriolis force (1)

Ocean surface temperature of at least 26,5 °C (1)

Calm (surface) conditions for several days/less friction (1)

Presence of low (air) pressure (1)

Unstable atmospheric conditions (1)

Evaporation from the sea surface / rising of warm moist air (1)

Upper air divergence (1)

Latent heat (1)

[ANY ONE]

(1x1) (1)

1.5.2 Southern (1) hemisphere

1.5.3 Air circulation around the low- pressure cell is clockwise (2)

Forward (leading) left-hand quadrant/dangerous semi-circle is located on the south-west of the tropical cyclone (2)

[ANY ONE]

1.5.4 A- has clear skies (1)

B- dense (cumulonimbus) cloud cover (1)

1.5.5 At A (eye) - air is descending (heating) results in no condensation (no formation of clouds) (2)

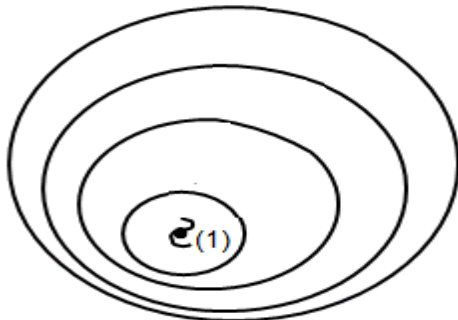
At B (eye wall) - air is rising (cooling) and results in condensation (the formation of clouds) (2)

1.5.6 Combination of the forward movement and rotation of the system (2)

It has a steep pressure gradient (2)

[ANY ONE]

1.5.7



Spacing of 4 isobars (1)

1.6

- | | | | |
|-------|--|-------|-----|
| 1.6.1 | 20 February (1) | (1x1) | (1) |
| 1.6.2 | Batsirai is located in the tropical easterly wind belt (2)
Driven by the easterlies/trade winds (2)
[ANY ONE] | (1x2) | (2) |
| 1.6.3 | The tropical cyclone reached the land (Madagascar) (2)
Frictional drag over Madagascar (2)
Decrease in moisture content (2)
Less latent heat available (2)
The tropical cyclone entered higher latitudes/cooler waters (2)
Atmospheric pressure increases (2)
[ANY TWO] | (2x2) | (4) |
| 1.6.4 | Coastal areas would be flooded (2)
Re-shaping of coastline (accept examples) (2)
Increased soil erosion (2)
Possibility of mass movement (accept examples) (2)
Destruction of biodiversity (accept examples)(2)
Destruction of habitats (accept examples) (2)
Pollution of water sources (2)
Pollution of soil (2)
(Accept) Damage to Infrastructure (accept examples) (2)
[ANY TWO] | (2x2) | (4) |
| 1.6.5 | The area is prone to tropical cyclones (2)
To observe the path of a tropical cyclone (2)
To observe the development of a tropical cyclone (2)
Enables advanced weather predictions (2)
Enables the collection of data on rainfall rates/wind speed (2)
Effective in providing early warning systems (2)
To reduce the level of impact of the system (accept examples) (2)
To be prepared and limit possible damages (accept examples) (2)
To have enough time to evacuate (2)
To plan/prepare emergency procedures (accept examples) (2)
[ANY TWO] | (2x2) | (4) |

[15]

1.7

- 1.7.1 Summer (1) (1x1) (1)
- 1.7.2 Weak descending air (2)
The inversion layer is above the escarpment/plateau (2)
Moist (onshore) winds will reach the interior (2)
Wet conditions over the interior (2)
[ANY ONE] (1x2) (2)
- 1.7.3 Plateau (1)
Height above sea level (1)
Ocean currents (1)
Inversion layer (1)
Descending air/Kalahari HP (Anticyclonic movement) (1)
Distance from the ocean (1)
[ANY TWO] (2x1) (2)
- 1.7.4 As air subsides it compresses and heats up (2)
Adiabatic heating due to subsiding air (2)
[ANY ONE] (2x1) (2)
- 1.7.5 **Sketch (A)**
Inversion layer is above the level of the plateau/escarpment (2)
Moist air flows into the interior (2)
Unstable conditions cause air to rise (2)
Condensation occurs and clouds form (2)
Results in more rainfall (2)
Sketch (B)
Inversion layer below the level of the plateau/escarpment (2)
Moist air cannot reach the interior (2)
Stable conditions cause clear skies (2)
Less/No condensation occurs (2)
Results in less/no rainfall (2)
[ANY FOUR – MUST INCLUDE CONDITIONS OF SKETCH A AND SKETCH B] (4x2) (8)

[15]

1.8

- 1.8.1 Kalahari high (1)
Coastal low (1) (1x1) (1)
- 1.8.2 B (1) (1x1) (1)
- 1.8.3 Air from the interior (KHPC) descends down the escarpment (2)
The air from the KHPC moves towards the low pressure (2)
Air is offshore towards the ocean (2)
[ANY ONE] (1x2) (2)
- 1.8.4 Air descending the escarpment (is offshore) hence dry (2)
Descending air heats up resulting in no condensation (no formation of clouds) (2)
Descending air heats up and remaining moisture is evaporated (2)
[ANY ONE] (1x2) (2)
- 1.8.5 **IMPACT**
A berg wind dries out the natural vegetation (2)
Berg winds increases the temperature of the area and makes it vulnerable to veld fires (2)
The veld fires destroy the natural vegetation (2)
STRATEGIES
Create firebreaks (2)
Ensure water accessibility (accept examples) (2)
Awareness of the negative impact of veld fires (2)
Availability of emergency services (2)
Build/maintain/monitor lookout towers/warning systems (accept examples) (2)
Education of the community (2)
Developing of wind breaks (2)
[ANY FOUR- MUST INCLUDE BOTH IMPACT AND STRATEGIES] (4x2) (8)

[15]

- 1.9
- 1.9.1 Kalahari High (1)
Coastal low (1) Accept Mid-latitude cyclone (1) (2x1) (2)
- 1.9.2 Accept in the range 43.9°C to 44,1 °C (1) (1x1) (1)
- 1.9.3 The escarpment has a greater vertical height (elevation) (2)
Greater frictional drag as air moves down the escarpment (increases temperature) (2)
Air has a greater vertical descent down the escarpment (1200m-0m) and heats up more (2)
Increased heating (DALR at 1°C/100m) due to vertical distance of the escarpment (2)
[ANY TWO] (2x2) (2)
- 1.9.4 Plants (Natural vegetation / Pasture) dry out due to the hot dry winds (2)
Reduction of biodiversity (fauna and flora) within the natural environment (2)
Declining ecosystems will disrupt food chains and food web networks (2)
Higher evaporation reduces soil moisture content (2)
Increased loss of moisture in soil will accelerate soil erosion (2)
The land is left bare and vulnerable and accelerates soil erosion reducing soil fertility (2)
Higher levels of carbon dioxide will increase atmospheric pollution (2)
Water from shallow pools, small non-perennial water bodies can evaporate (2)
Natural vegetation is destroyed by veld fires (2)
Loss of habitat/damage to ecosystems due to veldfires (2)
Increase in carbon dioxide as a result of veldfires impacts negatively on physical environment (2)
Ash of veldfires act as fertilisers for the development and growth of new vegetation (2)
Veldfires can promote seed germination (2)
[ANY FOUR] (4x2) (8)

[15]

1.10

- | | | | |
|--------|--|-------|-------------|
| 1.10.1 | A South Atlantic (1)
B South Indian (1) | (2x1) | (2) |
| 1.10.2 | Summer (1) | (1x1) | (1) |
| 1.10.3 | Line thunderstorms (heavy rainfall) occur in the interior (2)
Cumulonimbus clouds/lightning/hail (2)
Moisture front developed (2)
Air from the east/west reaches the interior (2)
[ANY ONE] | (1x2) | (2) |
| 1.10.4 | The boundary (dry line) between two air masses of different moisture content (2)
[CONCEPT] | (1x2) | (2) |
| 1.10.5 | (Heavy) Rainfall (1)
Hail (1)
Thunderstorms (1)
[ANY TWO] | (2x1) | (2) |
| 1.10.6 | Convergence of warm moist air and cold dry air (2)
Moisture front develops (2)
Cold dry air undercuts warm moist air (2)
Warm moist air rises (2)
Condensation occurs in the eastern side of the moisture front (2)
Cumulonimbus clouds develops (2)
[ANY THREE] | (3x2) | (6)
[15] |

1.11

- | | | | |
|--------|--|-------|------|
| 1.11.1 | Coastal Low (1). | (1x1) | (1) |
| 1.11.2 | It is a moving system (2) | (1x2) | (2) |
| 1.11.3 | Moist air is carried over the land at B (2)
Onshore winds at B (2)
Dry air is moving from land to sea at C (2)
Offshore winds at C (2)
[ANY TWO] | (2x2) | (4) |
| 1.11.4 | 23.01.2022 (Date) (2)
The high pressure cells are in a Southerly position (2)
Cold fronts/mid-latitude cyclones are further south (2)
A tropical depression is evident (2)
[ANY TWO] | (2x2) | (4) |
| 1.11.5 | a. E (2) | (1x2) | 2) |
| | b. E has a higher pressure (1032hPa) reading than D (1024hPa) (2)
D has a lower pressure (1024hPa) reading than E (1032hPa) (2)
[ANY ONE] | (1x2) | (2) |
| | | | [15] |

1.12

- | | | |
|--------|---|-----------|
| 1.12.1 | Thermal low (1)
Accept heat low (1) | (1x1) (1) |
| 1.12.2 | High temperatures (2)
Rising warm air creates low pressure system (2)
[ANY ONE] | (1x2) (2) |
| 1.12.3 | Elongation of isobars (2)
Bending of the isobars towards the low-pressure (2)
Outward extension/bulge of isobars away from the high pressure centre (2)
[ANY ONE] | (1x2) (2) |
| 1.12.4 | Anticlockwise circulation (from the high pressure) (2)
Ridge extends towards the land (low pressure) (2)
Elongation of isobars occurs towards the coastline (2)
[ANY TWO] | (2x2) (4) |
| 1.12.5 | Results in SSE winds (anti-clockwise circulation from the high pressure) (2)
Increase in wind speeds/strong /gale force winds (2)
Precipitation in the form of rainfall (2)
Possibility of drizzle (2)
Overcast conditions (increase in cloud cover) (2)
Increasing humidity (small difference between air temperature and dew point temperature) (2)
Decrease in air temperature (as air advects onto the land) (2)
[ANY THREE] | (3x2) (6) |

[15]

1.13

- 1.13.1 An urban area of higher temperature surrounded by a rural area of lower temperature (2)
[CONCEPT] (1x1) (1)
- 1.13.2 Accept: 34,6 °C to 34,8 °C (1) (1x2) (2)
- 1.13.3 High building density traps in heat (2)
Tall buildings create a larger surface area for heating (2)
Multiple reflections of heat between the buildings (2)
Dark painted buildings/roofs absorb heat (2)
Building materials (accept examples) result in more heat being absorbed (2)
Taller buildings limit air flow in cities (2)
Air conditioning used in the buildings cause more heat (2)
[ANY TWO] (2x2) (4)
- 1.13.4 Paint roofs or buildings with light colours (2)
Develop rooftop gardens (2)
Replace tar and concrete with cobble stones (2)
Minimise large glass windows/ structures (2)
Using green energy in buildings (2)
Use low energy light bulbs (2)
Decrease building density (2)
Improve insolation in buildings (2) Use eco-friendly/natural building materials (2)
Restrict the height of buildings (2)
Use mirrored glass which is more reflective (2)
Planned areas for parks/planting trees/water features (2)
[ANY FOUR] (4x2) (8)

[15]

1.14

- 1.14.1 Katabatic wind (1) (1x1) (1)
- 1.14.2 Air temperature increases with height/temperature inversion (1) (1x1) (1)
The highest temperature is found mid-slope (1)
Air temperature is warmer (1)
Temperature is above freezing (1)
[ANY ONE]
- 1.14.3 (Temperature) inversion/Valley inversion/Negative lapse rate (1) (1x1) (1)
- 1.14.4 Air temperatures are much lower (2)
Air is heavier and denser (2)
Increased intensity of downward movement of air/Cold air moves down the slope quickly (2)
[ANY TWO] (2x2) (4)
- 1.14.5 Collection of cold, dense air at the bottom of the valley (2)
Warm air is displaced from the valley floor (2)
Frost forms on the valley floor (2)
Gravity causes cold air to drain towards the valley floor (2)
Dew point temperature below freezing point (2)
[ANY TWO] (2x2) (4)
- 1.14.6 Only frost-resistant crops can be planted here/Grow fruit with thick resistant skin, e.g. citrus (2) (2x2) (4)

Genetically modified seeds adapted for frost conditions (2)
 Torches and fire drums (heating systems) to keep air circulating so that temperatures do not drop below 0 °C/anti-frost heating to protect crops (2)
 Fans to keep air circulating (2)
 Mechanisms to divert subsiding wind (diversion walls) away from crops (2)
 Straw in between crops to reduce terrestrial radiation (mulching) (2)
 Glass houses (greenhouses) can be built to create an artificial micro-climate for sensitive crops (2)
 Cover plants with frost covers (2)
 [ANY TWO]

[15]

1.15

- | | | |
|--------|---|-----------|
| 1.15.1 | An accumulation of dust, soot and smoke (pollution) particles over the city (1)
[CONCEPT] | (1x1) (1) |
| 1.15.2 | Urban areas produce more pollution/combustion released by cars, industries and other activities/More human activities (2) | (1x2) (2) |
| 1.15.3 | During the night subsidence is stronger/trapped closer to the ground/
inversion layer is closer to the surface at night (2)
Less activity resulting in heat generation to lift pollution dome (2)
Pollution covers a smaller area (2)
Less convection/thermal currents to distribute pollution at night (2)
[ANY TWO] | (2x2) (4) |
| 1.15.4 | Soot accumulation on buildings results in more cleaning services needed (2)
Results in acid rain which results in peeling of paint of buildings (2)
Buildings must be painted more often (2)
Concrete surfaces become pitted (holes) and must be maintained/renovated more frequently (2)
Metal structures such as metal window frames/air conditioners become corroded because of the acid rain/renovated more often (2)
Replacing damaged material with good quality/durable material is costly (2)
Regular replacement/purchase of air conditioner filters (2)
More regular painting of road markings as acid rain makes it peel easier (2)
High pollution results in higher rainfall and can cause flood damage (2)
Damaged plants in gardens to be replaced (2)
Water reservoirs/dams become polluted and money spent to purify water (2)
[ANY FOUR]. | (4x2) (8) |

[15]

GEOMOPHOOGY

2.1

2.1.1	B (1)	(1x1)	(1)
2.1.2	G/E (1)	(1x1)	(1)
2.1.3	A (1)	(1x1)	(1)
2.1.4	C (1)	(1x1)	(1)
2.1.5	E (1)	(1x1)	(1)
2.1.6	H (1)	(1x1)	(1)
2.1.7	D (1)	(1x1)	(1)
2.1.8	F (1)	(1x1)	(1)
			[8]

2.3

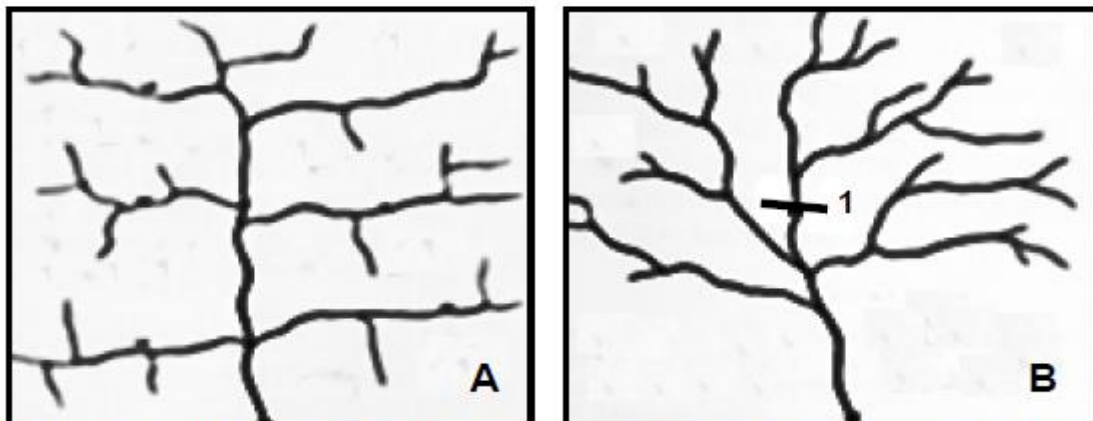
- 2.2.1 Permanent (1) (1x1) (1)
- 2.2.2 Dendritic drainage pattern (1)
Volume of water increases from source to mouth (1)
High water table (1)
Tributaries are divided by Interfluves (1)
2nd order stream (1)
Low drainage density (Few tributaries) (1)
Permanent / Perennial river (1)
The river intercepts the water table (in wet and dry season) (1)
Gentle gradient (1)
The tributaries are joining the mainstream at an acute angle (1)
[ANY TWO] (2x1) (2)
- 2.2.3 Less vegetation at A (2)
More tributaries feed the channel at A (2)
The channel at A is wider (2)
Higher volume of water at A (The line indicating the river is thicker at A) (2)
A is in the middle or lower course (2)
Higher stream order at A (2)
[ANY TWO – MAY ANSWER WITH REFERENCE TO B] (2x2) (4)
- 2.2.4 Refer to C.
- (a) Z (2) (1x2) (2)
- b) The river intercepts the wet and dry water tables (2) (1x2) (2)
- 2.2.5 How will a decrease in precipitation affect the following:
- a. It will lower the water table (2) (1x2) (2)
- b. It changes to a periodic or episodic river (non-perennial) (2)
The type of the river remains unchanged (permanent) (2)
[ANY ONE] (1x2) (2)
- [15]

2.3			
2.3.1	Upper course (1)	(1x1)	(1)
2.3.2	Width/Breadth (1) Depth (1) Shape (1) Heights of interfluvies change (1) [ANY TWO. ACCEPT DESCRIPTION OR MEASUREMENTS]	(2x1)	(2)
2.3.3	In the upper course vertical/downward erosion takes place (2) In the lower course deposition/lateral erosion takes place (2)	(2x2)	(4)
2.3.4	(Increased) lateral erosion/(decreased) downward erosion results in a river valley widening (2) Sheet flow down the valley slopes will result in the lowering of the slopes (2) River slows down in the middle course causing deposition which decreases the depth of the valley (2) More gentle gradient in the middle course causing deposition which decreases the depth of the valley (2) Meandering river will widen the valley floor (2) Where the river exits the confines of the mountain, the river valley will be wider (2) Greater volume of water and lower velocity will increase lateral erosion in the middle course (2) [ANY TWO]	(2x2)	(4)
2.3.5	In the upper course of the river the valley is narrow (2) Cost of construction of the dam wall will be cheaper (2) The rocky banks will make the structure stronger (2) The dam will be deeper because of the deep valley (2) Cooler temperatures at higher altitude, therefore less evaporation (2) Smaller water surface area reduces evaporation rates (2) A deeper dam will have an increased capacity (2) Less silt in the dam as there are fewer tributaries that enter the dam (2) Steepness of slope allows easy flow of water into a dam (2) [ANY TWO]	(2x2)	(4) [15]
2.4			
2.4.1	The side view of a river from source to mouth (2) [CONCEPT]	(1x2)	(2)
2.4.2	Smooth/Graded (1) Concave shaped (1) Steeper in the high-lying area (1) Gentle in the low-lying area (1) (Accept) Permanent base level (1) (Accept) No temporary base levels/ waterfall (1) [ANY TWO]	(2x1)	(2)
2.4.3	Graded (1)	(1x1)	(1)
2.4.4	Temporary base levels not evident (2) It has a smooth concave profile (2) [ANY ONE]	(1x2)	(2)
2.4.5	Temporary base level: waterfall (1) Permanent base level: sea (1)	(2x1)	(2)

- 2.4.6 Erosion of softer layers of rock below waterfall (2)
Headward/backward erosion will cause the waterfall to migrate upstream (2)
Downward erosion deepens the plunge pool (2)
Hard layer of rock falls into plunge pool as not supported by underlying softer rock (2)
Deposition of sediments in plunge pool and continues towards the lower course (2)
Equilibrium between erosion and deposition will maintain a graded state (2)
[ANY THREE]

(3x2) (6)
[15]

2.5 Refer to the diagrams showing drainage patterns.



ed from <https://www.google.com/search?q=trellis+and+dendritic+drainage+patterns>

- 2.5.1 A Trellis (1)
B Dendritic (1) (2x1) (2)
- 2.5.2 A Alternate layers of hard and soft rock/ folded rock structure (2)
B Rock that is uniformly resistant to erosion (2) (2x2) (4)
- 2.5.3 The streams flow in relation to the folds of the rock (2)
The streams flow over softer rock of the syncline (valley) (2)
Interfluvies are parallel (2)
[ANY ONE] (1x2) (2)
- 2.5.4 3rd (order) (2) (1x2) (2)
- 2.5.5 Higher (1)
- 2.5.6 (a) The low rainfall will result in a lower drainage density (2)
(b) The steep gradient will result in a higher drainage density (2) (1x2) (2)
- 2.6
- 2.6.1 A- rectangular(1)
B- dendritic (1) (2x1) (2)
- 2.6.2 Rock structure
Jointed/faults (1)
Horizontally layered (1)
[ANY ONE] (1+2) (2)
- Rock type
Igneous (1)
Sedimentary (1)
[ANY ONE]
- 2.6.3 Rivers flow in joints that have 90° bends (2)
Tributaries join main streams at 90° angles (2)
[ANY ONE] (1x2) (2)
- 2.6.4 High (1) (1x1) (1)
- 2.6.5 4th (2) order (1x2) (2)
- 2.6.6 The higher the stream order, the higher the drainage density (2) (1x1) (1)

2.6	2.6.7	The steeper slope (gradient) promotes run off (cuts more river channels) (2) Rocks with low permeability (impermeable) promote more run-off (less infiltration) (2)	(2x2)	(4) [15]
	2.7			
	2.7.1	Upper (1).	(1x1)	(1)
	2.7.2	Deep valleys (2) Narrow/V-shaped valley (2) Steep slopes (2) Gorge (2) Interlocking spurs (2) Vertical erosion is dominant (2) [ANY TWO]	(1x2)	(2)
	2.7.3	A body of water's/river falling over hard rock/steep slope/vertical cliff (2) [CONCEPT]	(1x2)	(2)
	2.7.4	Y- resistant/hard rock (1) Z- less resistant/ soft rock (1)	(2x1)	(2)
	2.7.5	The softer rock (Z) is eroded leaving the hard rock (Y) exposed (2) Erosion/undercutting of less resistant/soft rock occurs (2) Erosion/undercutting will create a plunge pool (2) The resistant/hard rock (Y) is not supported by the soft rock (Z) and overhang (2) The overhanging resistant/hard rock collapses (2) [ANY THREE]	(3x2)	(6) [15]
2.8				
	2.8.1	Deposition (1)	(1x1)	(1)
	2.8.2	Gentle/ flat/ level (2) (1	(1x2)	(2)
	2.8.3	Increased deposition of silt/alluvium/sand on the floodplain (2) River is shallow resulting in more deposition (2) Many tributaries deposit sediment (2) The gentle slope reduces the velocity of the river and the amount of sediment carried (2) Regular flooding in the area (2) [ANY TWO]	(1x2)	(2)
	2.8.4	The deposition of silt increases the width of the floodplain (2) The deposition of fertile soil materials improves the nature and amount of vegetation available on the floodplain (2) Deposition of alluvium increases the quality of the soil (2) Levees form on the floodplain as flooding occurs (2) Create wetlands which are habitats for living organisms (2) Increases soil moisture content that supports vegetation/ improves biodiversity (2) Allows floodwaters to spread out and excess water is stored (2) Continuous flooding purifies water/increase water quality (2) The water table rises resulting in marshes and vleis/ wetlands on the floodplain (2)	(4x2)	(8)

The waterlogged soils reduce access to parts of the floodplain (2)
 The level of infiltration along the floodplain increases the saturation level of soil (2)
 The biodiversity of the floodplain alters to adapt to the changing conditions (2)
 Continuous flooding or submergence negatively impacts on the natural vegetation/floodplain (2)
 [ANY FOUR]

2.9

2.9.1 Lower (1)

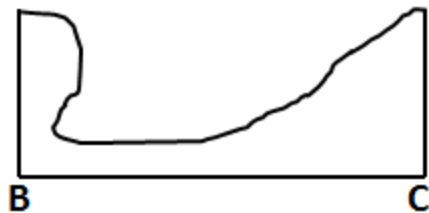
(1x1) (1)

2.9.2 Meander (1)

(1x2) (2)

2.9.3

(2x1) (2)



a.

b. B (1)

(1x1) (1)

c. The river flow is faster (at the outer bank) (2)

The river has more energy (2)

[ANY ONE]

(1x2) (2)

2.9.4 The outer bank of the river gets eroded (2)

Deposition takes place on the inner bank (2)

Continuous erosion and deposition cause the neck to become narrower (2)

Meander loop develops (2)

During flooding, the river cuts through the meander neck (2)

Deposition occurs at the neck of the meander loop (2)

The meander loop is now separated from the main stream forming an oxbow lake (2)

[ANY FOUR]

(4x2) (8)

2.10

2.10.1 When flooding occurs, the largest material will be deposited on the bank of the river, to form a natural embankment/levee. (Concept)

(1x2) (1)

2.10.2 Coarse sediment

(1x2) (2)

2.10.3 Each time the river overflows, it deposits material

(1x2) (2)

The type of material may vary in texture thus many different layers

Silt / sediment is deposited in a new layer

Slow movement of water over the floodplain causes deposition of silt

Flood water flows higher than the river banks / sediment is deposited

(ANY TWO)

2.10.4 The silt increases the fertility of the soil

(1x2) (2)

Fertile soil increases the growth of vegetation

Fertile soil increases the production of crops
Higher crop production results in higher income
Fertile soil results in lower input costs
(ANY ONE)

- 2.10.5 Flooding could result in the loss of farmer's lives
Damage to property – farmhouse and sheds
Destruction of crops
Loss of livestock
Deterioration of health conditions owing to waterborne diseases
Infrastructure such as power plants, roads and bridges are damaged which
leads to some economic activities / influencing the profits of farmers
negatively
People are forced to leave their homes – rural / urban migration
Loss of land value in the floodplains can leave farming communities
economically vulnerable
(ANY THREE)

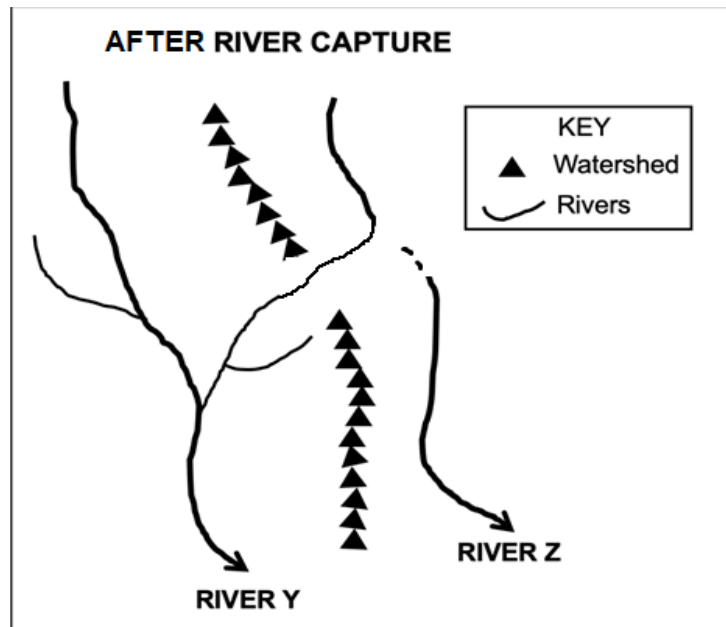
(3x2) (6)
[15]

2.11 Refer to the sketch map of rivers Y and Z before river capture has taken place.

2.11.1 When a more energetic river captures the headwaters of a less energetic river (2) (1x2) (1)
[CONCEPT]

2.11.2 A steeper gradient (on the one side of the watershed) (2)
More rainfall (on one side of the watershed) (2)
Less resistant/softer rock (on the one side of the watershed) (2)
[ANY ONE]

2.11.3 (1x2) (2)



2.11.4 River Y (1) (1x1) (1)

2.11.5 River Y has an increased volume of water (2) (1x2) (2)

2.11.6 Refer to your answer to QUESTION 2.5.5 and explain the impact of the change on the captor stream.

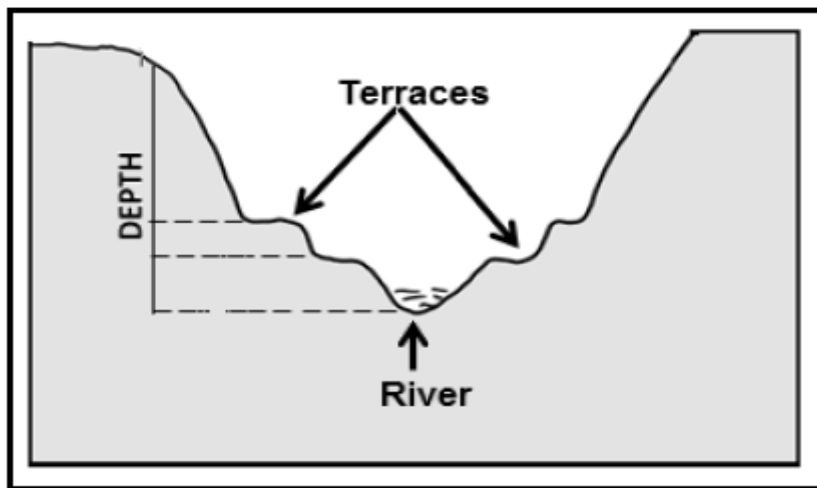
[15]

2.12

- 2.12.1 A (1) (1x1) (1)
- 2.12.2 It is flowing at a lower level (220m) (2) (1x2) (2)
 It has captured river B (2)
 River A erodes (headward) through the watershed (2)
 Steeper gradient to watershed (220-880m) (2)
 More volume of water at River A (2)
 [ANY ONE]
- 2.12.3 C - Elbow of capture (1) (2x1) (2)
 D - Wind gap (1)
- 2.12.4 It is a dry area (2)
 It has river gravels (2)
 It is located below the elbow of capture (2)
 It is located above the misfit stream (2)
 [ANY ONE] (1x2) (2)
- 2.12.5 Volume of water of the river decreases (2)
 Rivers velocity/speed decreases (2)
 River has less energy (2)
 River has less erosive ability (2)
 River will experience more deposition (2)
 The length of the river is shortened (2)
 Stream order will decrease (2)
 River will become non perennial (accept episodic/periodic) (2)
 Width of the river is reduced (2)
 Size of the drainage basin decreases (2)
 [ANY FOUR] (4x2) (8)

[15]

2.13 Refer to the sketch on river rejuvenation.



[Source: Examiner's own sketch]

- 2.13.1 The increase in the energy of a river to erode (2) (1x2) (1)
- 2.13.2 Change in the gradient (1)
 Accept: Isostatic uplift (1)
 Drop in sea level (1)
 Increase in volume of water (1)
 Accept: River capture (1)
 Increase in precipitation (1) (1x1) (1)

Fast flowing river joining (1)

2.13.3 Directly proportional relationship (2)
The greater the vertical erosion the deeper the valley (2)
[ANY ONE] (1x2) (2)

2.13.4 Terraces (1)
Valley in a valley (1) (2x1) (2)

2.13.5 As a result of vertical erosion the floor of the old river valley forms
terraces on either side of the river (2)
Due to vertical erosion a new valley is carved into the old valley resulting
in a valley in a valley (2) (2x2) (4)

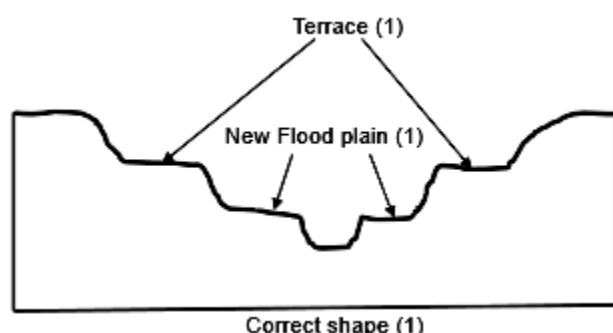
2.13.6 Increase in erosion (2)
Erosion results in the loss of fertile soil/arable land (2)
Erodes/collapse of river banks (2)
River can overflow its banks (2)
Soils become saturated/water-logged (2)
Destruction of fluvial landforms (accept examples) (2)
Disruption of food chains / food webs (2)
Damages the natural vegetation/biodiversity (2)
Less land available for natural habitats (2)
[ANY TWO] (2x2) (4)
[15]

2.14

2.15.1 A process where a river regains energy (and begins to erode
vertically/downwards again) (2) (1x1) (1)

2.15.2 Change in gradient (1) OR
(Accept Isostatic uplift (1) and/or Drop in sea level (1))
Increase in the volume of water (1) OR
(Accept Increase in rainfall (1) and/or River capture (1))
Joining of a faster tributary (1)
[ANY TWO] (1x2) (2)

2.15.3



(1x2) (2)

2.15.4 A rejuvenated river cuts into the valley floor (2)
Downcutting creates a new flood plain (2)
A step forms between the old and new flood plains (2)
[ANY TWO] (2x2) (4)

2.15.5 Steepness of slopes will hamper construction of roads/railway lines (2)

Softness of the underlying rocks causes instability to roads/ railway construction (2) (2x2) (4)
Terraces make it costly to build bridges (2)
Wide flood plain makes it difficult to build bridges (2)
[ANY TWO]

[16]

