GSSCORE

An Institute for Civil Services

IAS TOPPER'S

TEST COPY

RUPAL SRIVASTAVA

AIR - 113

(CSE 2022)

GEOGRAPHY OPTIONAL

8448496262 iasscore.in

GS SCORE

Geography

Mock - 1 Paper - I

GEOGRAPHY

Time Allowed: 3 Hrs. Max. Marks: 250

Instructions to Candidate

- Please read each of the following instructions carefully before attempting questions.
- There are EIGHT questions divided into TWO SECTIONS and printed in ENGLISH.
- The candidate has to attempt FIVE questions in all.
- Question Nos. 1 and 5 are compulsory and out of the remaining, THREE are to be attempted by choosing at least ONE question from each Section.
- The number of marks carried by a question/part is indicated against it.
- Answers must be written in the medium authorized in the Admission Certificate which must be stated clearly on the cover of this Question-cum-Answer (QCA) Booklet in the space provided. No marks will be given for answers written in a medium other than the authorized one.
- Word limit in questions, wherever specified, should be adhered to.
- Illustrate your answers with suitable sketches/maps and diagrams, wherever considered necessary. These shall be drawn in the space provided for answering the question itself.
- Attempts of questions shall be counted in sequential order. Unless struck off, the attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.

1. Invigilator's Signature _____

2. Invigilator's Signature _____

Name RUPAL SRIVASTAVA

Mobile No. _____

Date _____

Signature Rupal.

Start : 10:30 AM.

1372

⇒ Just try to follow the same approach in mains examination

All the Best!

REMARKS

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5 Roll No. 34377

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Section - A

1. (a) Explain the mechanism of the formation of Bomb Cyclone (10 Marks)

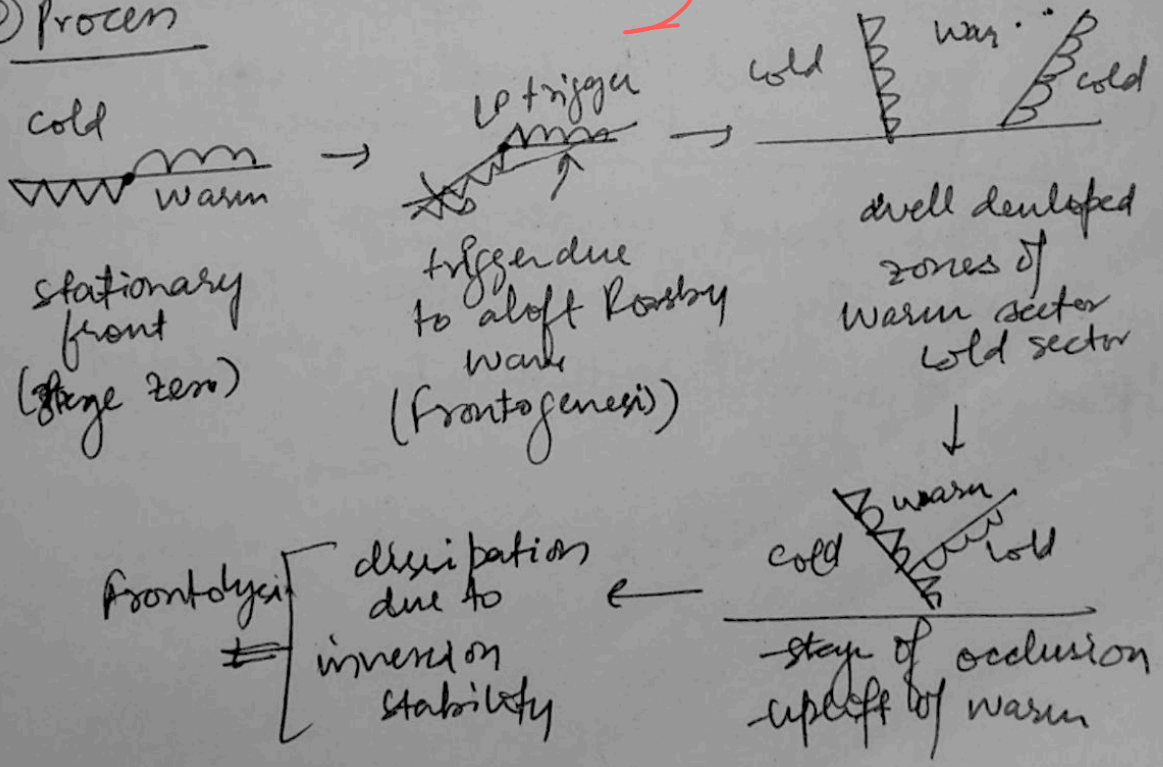
Bomb cyclone also known as 'Bombogenesis' are a type of cyclones formed in the midlatitudes. Recently, they had been observed on the North-Eastern coast of USA

Mechanism for formation

① Generally frontal in origin, with both cold and warm fronts.

Season ?

② Process



Remarks

③ Generally - Warm front - orographic type of rainfall
↳ cold front = convectional type of rainfall.

Less rainfall for longer duration

Short duration, heavy rainfall

Different from tropical cyclones

Bomb cyclone	Tropical cyclone
① have both warm + cold front	① Warm core due to 'thermal' origin
② Midlatitude	② low-latitude
③ Mainly late spring	③ ~~Summer~~ Mostly in- August September - October
④ Big system but less intense	④ Small system but intense

The recent climate change has increased the intensity of Bomb cyclones. Proper proofing of human settlements is needed.

(5)

Remarks

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1. (b) 'Modern day land forms bear **more complexity than simplicity'. Elaborate.**
(150 Words) (10)

According to WD Thornbury, the modern day landforms cannot be explained on the simple model based studies of 'time' or 'process'. They bear more complexity than simplicity.

Land

A Complexity of the process

① establishing exact relation between what process producing which landform

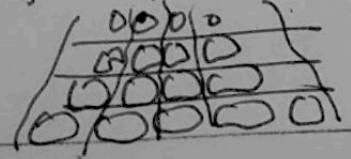
② most land forms are
- polycyclic → Eg: Pat lands of Kandi, Appalachians
- polygenetic → Peneplains of Telangana → wind erosion + fluvial + chemical.

B complexity of the role of climate

① unlike LC king's uniformitarianism, climate has a complex role.

② Stoddart explains this as Quaternary climate change has been intense and could not be preserved.

Eg: Tors → JA Palmer and PA Wilson - consider them as periglacial landforms but some call them as arid eroded structures.



Remarks

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(c) Complexity due to tectonic changes as said by Morisawa. Tectonic changes can lead to catastrophic landform modifications
Ex: Resurrected peneplains of Utah (USA)

(d) Also complexity due to floro-proces, anthropo-proces where landforms have been modified by humans.
Ex: Changes in himalayan landscape due to tourism.

Some examples can be given

According to CG Higgins, no model can perfectly describe a landform as they all have generalization of reality. The real world proces are multiple and complex term affecting the landscape development

5 1/2

Remarks

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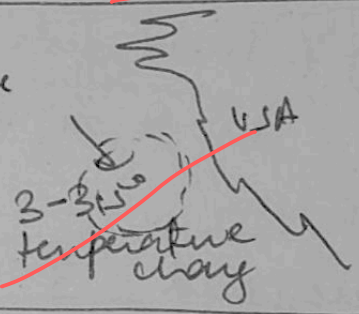
1. (c) What is marine Heat wave? Discuss its consequences. (150 Words) (10)

Marine heat wave refers to a condition of abnormal increase in the ocean temperature for a period of 4-5 consecutive days (as per NOAA)

It can occur due to direct insolation led heating or also due to heat influx from air-sea interaction as per B. Jerkens.

Covers

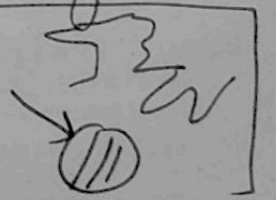
Eg: Marine heat waves in the Pacific off the Hawaii coast in 2020



Consequences

① Increase thermal stratification impacting the mixing of nutrients by upwelling and oxygen by downwelling leading to 'hypoxic zone'

Eg: Bay of Bengal - Hypoxic Patch near West Benga



② Changes in Ocean water chemistry affecting the salinity patterns and thermohaline circulation.

Remarks

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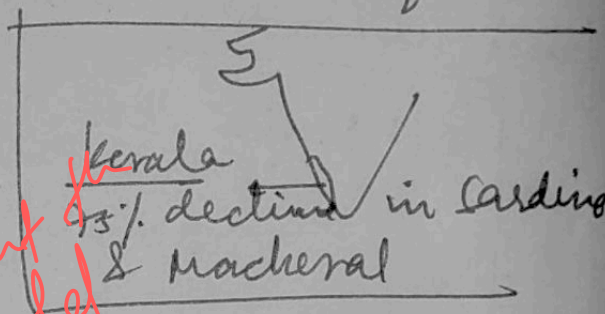
Eg: Higher Indian Ocean temperature (in Arabian sea region) ⟹ speeds up the AMOC

(3) Impact on Marine biodiversity

(i) Critical ecosystem like corals - bleaching due to increased sea surface temperature

Eg: Australian heatwave of 2017 – 40% damage to Barrier Reef

(ii) Reduced fish catch due to migration



(4) Increased tropical cyclones due to warm water

Eg: Arabian sea cyclones

Marine heat waves are expected to increase by 2.5 – 3 X (times) in the next decade. Climate change mitigation must step in to control.

Irrelevant

5

Remarks

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1. (d) Present an account of threat faced by various biomes across the world. (150 Words) (10)

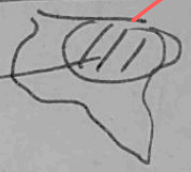
According to IPBES Report, globally 33% of biomes are under threat due to climatic and anthropogenic factors.

Threats faced -

(1) Tropical rainforest biome

(a) Increasing incidences of forest fires due to clearance for lumbering / ranching

Eg: Amazon lost 600 km^2 of forest in 2019 fires



(b) Reclamation of wetlands for conservation
Eg: Londrina thrent.

(2) Threats to deciduous biomes - both temperate and tropical deciduous due to valuable hardwood in construction

Eg: India's teak forest decline in MP by 24% (ISFR 2021)

(3) Threats to taiga biome - due to climate change and heat waves - forest fires.
Eg: Canada - forest fires in 2020 in the taiga forests

(4) Threats to the desert biomes due to rapid expansion of deserts and loss of xerophytes.

Remarks

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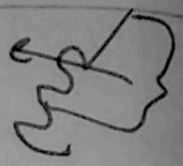
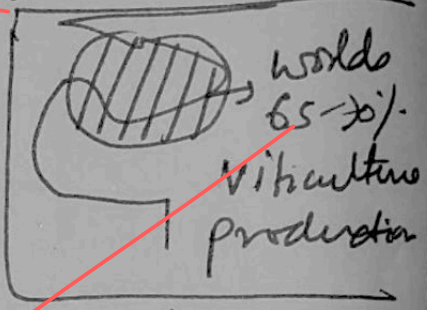
Ex: Rajasthan - cutting of Khejri trees for solar plants.



⑤ Threats to critical biomes of coral ecosystem due to acidification, warming

Ex: IPCC Predics 70% loss in corals at present warming rate.

⑥ The Mediterranean biome under threat due to rapid plantation growth leading to soil degradation



It is necessary to conserve the biomes in the watershed based approach to maintain environmental sustainability.

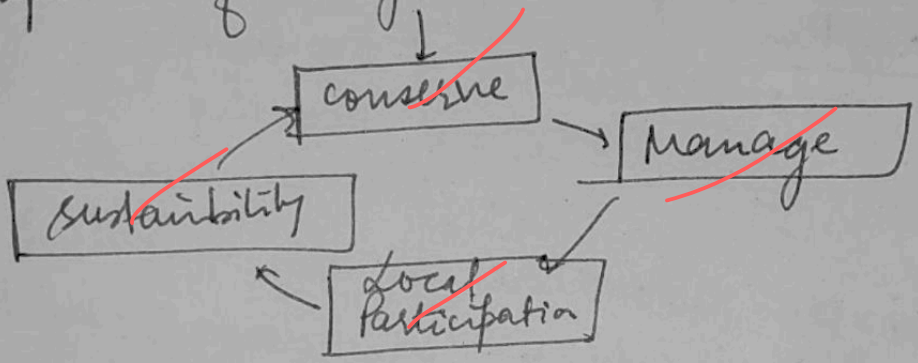
Remarks

1. (e) What is Eco-system restoration? Discuss with suitable examples.

(150 Words) (10)

According to Stuart Chapin, ecosystem restoration is halting the proces of ecosystem degradation and revival of the damaged ecosystem by ecosystem based approach.

Components of Ecosystem Restoration



Examples of ecosystem restoration

① Coral restoration by bio rock technology to create the calcs structures in the damaged corals

Eg: Recently tried in the Lakshwadeep corals (30% of India's coral)

② Restoration of desertified areas → watershed based approach.

Case: Chambal Badland
- millet farming
- Rain water harvest
- flattening badland topography.

Chambal Bhind, Morena etc

Remarks

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③ Restoration of Rainforest in Brazil

Eg: Creating fire strips to reduce means of fires and provide rejuvination.

- 20% of O2 of world
- 2.5-4.4bn tonnes Co2 capture

④ Restoration of Mangrove and Coastal ecosystem

Es: Declaration of Eco Sensitive zones and planting trees in these biome like Sundarbans etc

Ecosystem restoration is an important step in mitigating the damages due to climate to critical species.

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2. (a) Discuss the causes of **rejuvenation of fluvial cycle of erosion** and describe the characteristics of the resultant **polycyclic landforms with examples.**

(250 Words) (20)

Rejuvination of fluvial cycle of erosion occurs due to negative base level change. It initiates a second cycle of erosion as per the Davisian fluvial cycle.

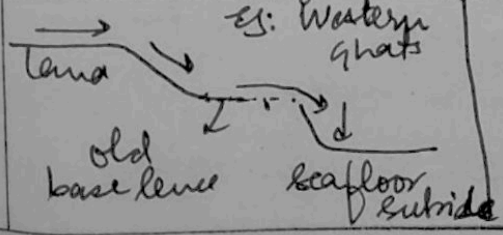
Causes of Rejuvination

Dynamic Rejuvination

↓

happens due to tectonic changes leading to subsidence of the sea floor or the rise of land.

↓ Fig 1

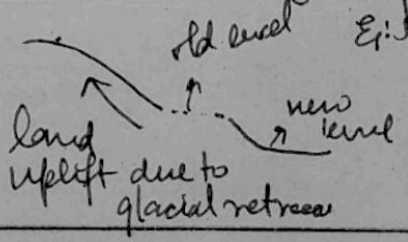


Eustatic Rejuvination

↓

Happens due to mix of climatic factors changing the sea level and isotatic factor of local land rebound

↓ Fig 2.



Eg: Scandinavia

Static Rejuvination

↓

due to changes in the river sediment load leading to base level change.

Remarks

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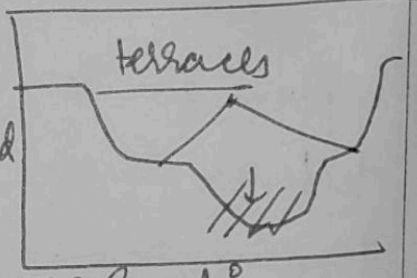
The Davis cycle of erosion mainly considers the dynamic rejuvination of the base level as an 'accident' in the normal cycle. This leads to the formation of polycyclic landforms due to 2nd cycle.

Polycyclic landform characteristics

① Formation of 'discordant topography' in the areas of rejuvination

② 'River terraces' → short flat surface of old base level incised within the new level forming terrace



Eg: Ranchi landscape in India

③ Knickpoint waterfalls along the terraces leading to plunge pools and rapids

Eg: the Hundru Falls in the Ranchi Plateau in India

④ Incised river valleys – valley within the valley showing evidences of 2nd cycle of valley

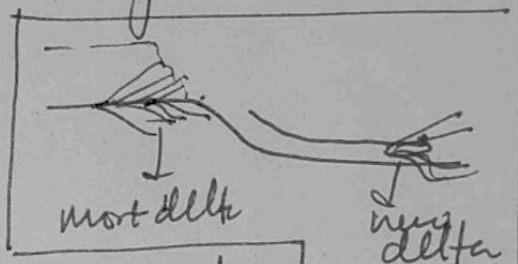
Remarks

deepening.

(5) Incised Meanders - the rejuvination leads to formation of new meander paths with the old meander being 'entrenched' within

Eg: Brahmaputra near the mouth forming double meanders in Bangladesh

(6) Most deltas - the old delta being abandoned and finer sediments forming new delta.



Eg: Mississippi delta due to compaction and sedimentation of mississipi drainage.

(7) Along with this, there are resurrected / uplifted peneplains which would not have formed in the normal cycle of erosion.

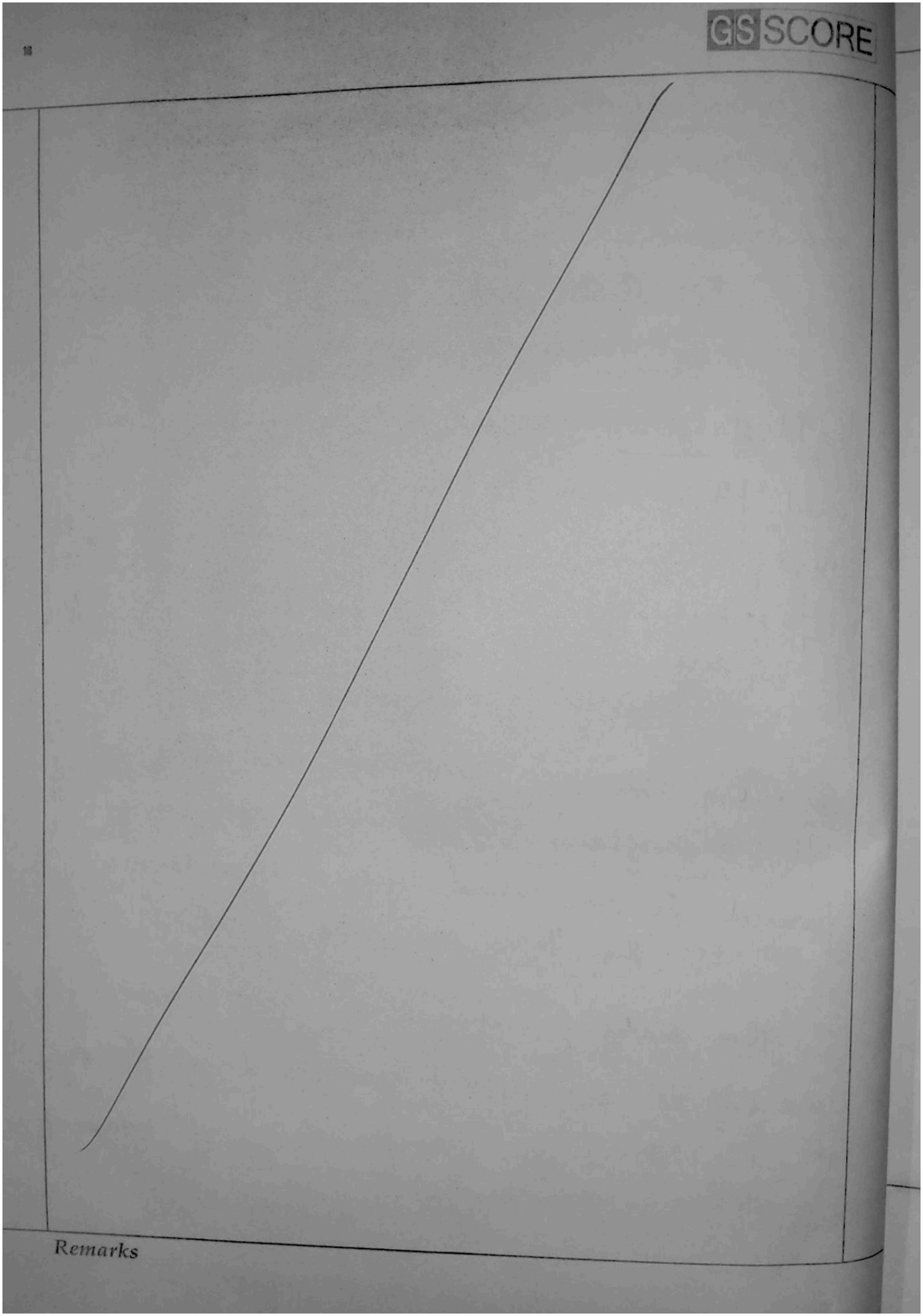
Eg: the Utah peneplains of USA.

Good

the study of 'rejuvination' cycle of erosion can help in the applied geomorphological planning of settlements in the floodplain areas of tectonically active river basins.

12.2

Remarks



Remarks

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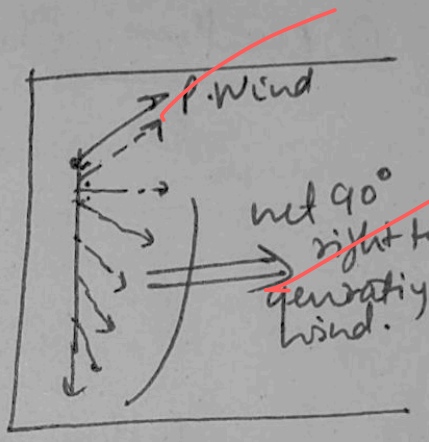
2. (b) Discuss the forces which influence the Ocean Currents. Also, explain with examples why oceanic circulation pattern roughly corresponds to the earth's atmospheric circulation pattern. (200 Words) (15)

Ocean currents are influenced by a number of forces - current generating and current modifying forces.

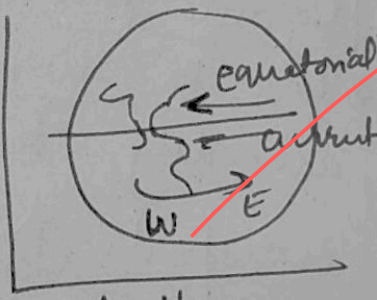
Current generating forces

① Planetary wind drag - According to Ekman transport, winds are Primary driver of current by their surface drage



② Secondary generating forces

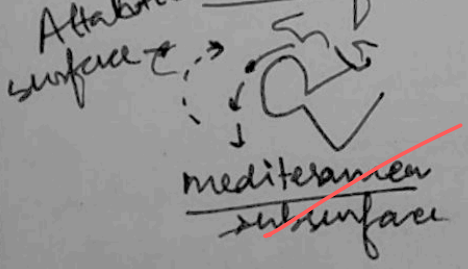
ⓐ Rotation at the equator piling up of water due to west to east rotation



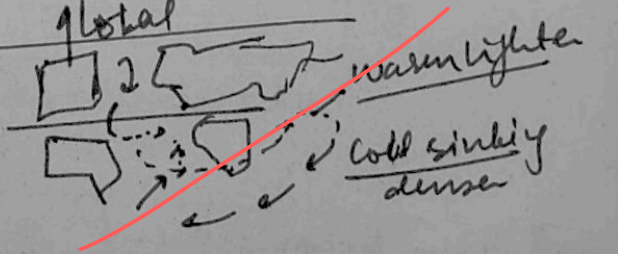
ⓑ Density driven - Ocean' factor temperature and salinity drive the currents both surface and global

Surface

Atlantic surface



Global



Remarks

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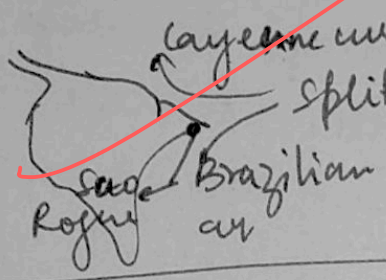
Current modifying factors

① Coriolis – Pseudo force produces an apparent deflection
- North hemisphere = Right
- South → towards left

North Atlantic Drift (towards right) in North

② Coastline indentation and Ocean Relief

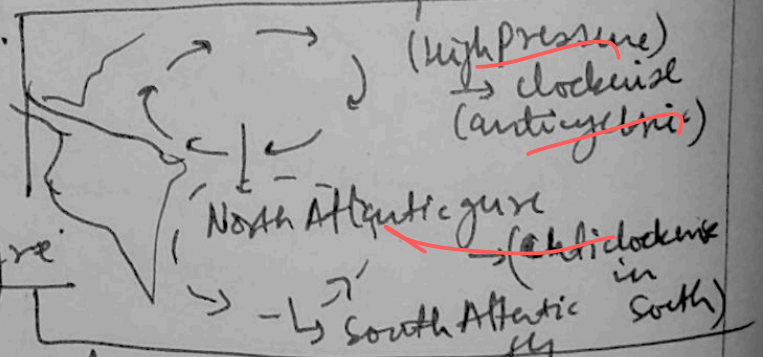
Eg:



Oceanic pattern corresponds to atmospheric pattern
- due to air mass and ocean current interaction

according to V Jerkins, patterns of circulation correspond. ① Gyre:

Eg: Subtropical High Pressure Belt



formation of gyre
- direction
- also speed = slower circulation

② Indian Ocean current and reversals
- Influenced under the monsoonal circulation and their reversal due to shifting of ITCZ can be seen.

Remarks

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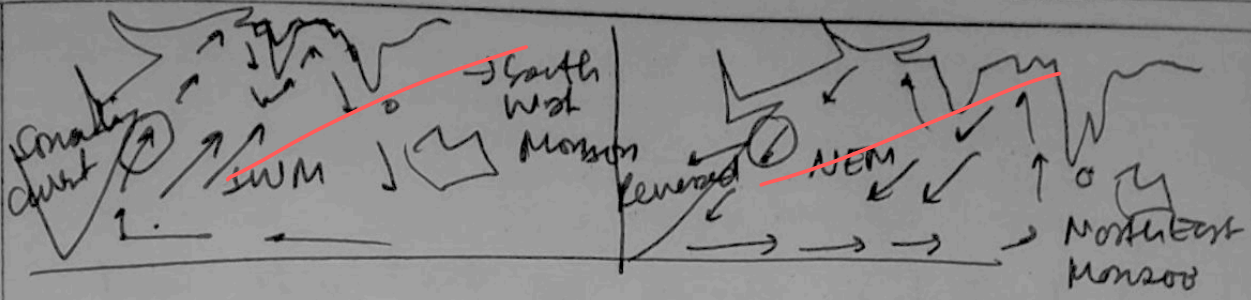
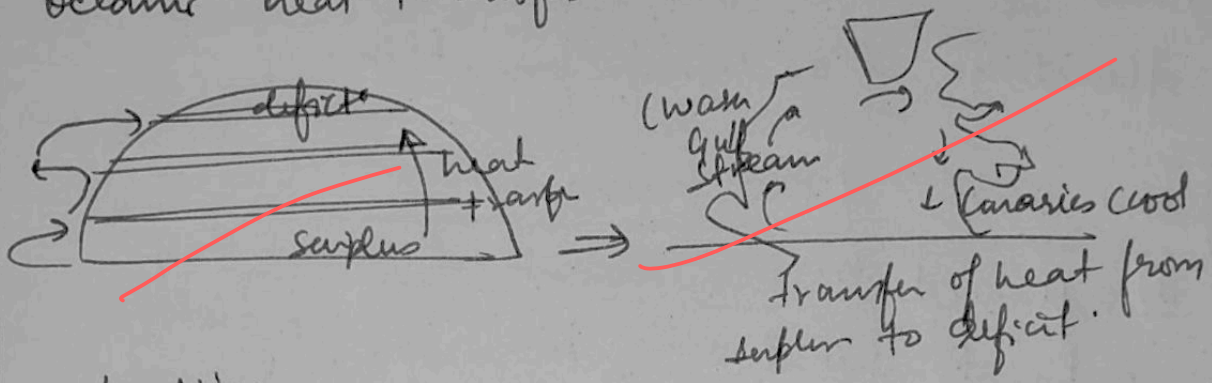
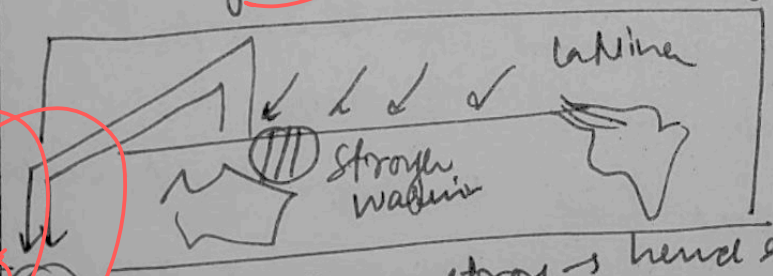


③ Atmospheric heat transfer circulation linked to Oceanic heat transfer.



④ La Nina Impact

↳ strong trade winds → strengthen the currents



↳ Mascarene high → strong → hence stronger Indian Monsoon.

Ocean and atmosphere interaction forms a systemic interaction to understand the process and outcome

GS SCORE

2. (c) How Plate tectonic theory is still not satisfying the modern geologists despite being a major theory explaining the geological formations on earth? Discuss in the light of criticism associated with the theory. (200 Words) (15)

Plate Tectonic theory by Mackenzie and Parker provided a break through in the explanation most of geological formation.

Some merits of the theory over drift theorie

① Explained the development of present day continents by studying the 'hotspot evidence' fossil evidence.

② scientific explanation for mountain building
Eg: Himalayan upliftment in 3 stages
Thesh Miocene → Pliotocene

③ Understand disasters like - Earthquake, Vulcanism etc as a consequence of plate boundary interaction. Eg: Pacific Ring of Fire = subduction

However, the theory had its own limitation

① Initial description of plates by Mackenzie had been faulty. as Lithosphere is not rigid, brittle

Remarks

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(2) The reasons for generation of convection current and their strength to drive the plates has not been scientifically proven.

(3) Could not explain the occurrence of intra plate earthquakes and volcanism very properly.
Eg: Reactivation of Narmada-Son-Godavari lineament

(4) Since the rate of subduction < rate of expansion of crust (NASA evidences), the theory could not give reasons for this imbalance or counter the 'Expanding earth' hypothesis

(5) the convection cells, if present, should not have led to formation of unconformities at the boundaries
Eg: Conrad, upper and lower crust; Mohorovic, crust and upper mantle.

(6) Also does not explain the origin of earliest crust - 'Rhodinia / Pangea I'

Remarks

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Despite these limitation, PT theory still remains one of the most conclusive evidences of earth's evolution. This knowledge is used in hazard mapping in the applied geomorphology of Dkc Jones.

8

Remarks

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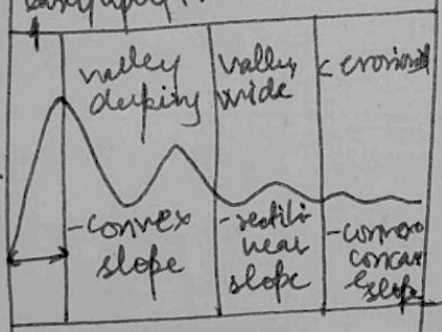
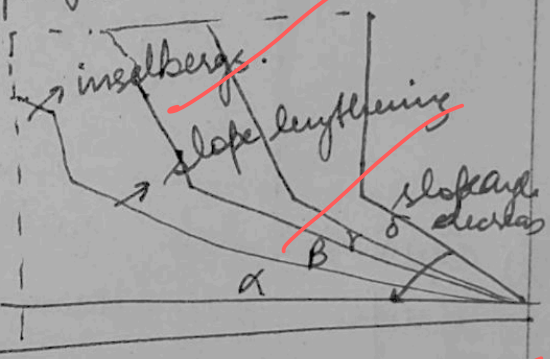
4. (a) Discuss the difference in the models of slope evolution proposed by Davis and Penck. (250 Words) (20)

Davis and Penck gave models of slope evolution based on different approaches of 'time' and 'process' respectively. Good

The differences can be seen as-

	Davis Model	Penck Model
(1) Basic Premise	Evolution of slope as a factor of time (age)	Evolution of slope due to interaction between endogenetic and epigenetic process.
(2) Stages of slope development		
(3) Method	slope decline from top to bottom	slope replacement from the base (new slope overgrows the old slope.
(4) Role of structure	Generalised the role of structure	Structure impacts the rate of weathering, slope exposure and removal

Remarks

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(5)	Role of Process	- Only erosional process operates throughout - initial sudden upliftment for a short period - once endogenetic stops then exogenetic sets in.	Interaction between both endogenetic and exogenetic together - Waxing = endo > exo - constant ⇒ endo = exo growth waning = endo < exo
(6)	Role of river	river as the main erosional agent	Role of river in 'basal sapping' only, weathering by other agents
(7)	Equilibrium of slope	slope equilibrium only attained after end of cycle - decay equilibrium	Equilibrium can be attained at any 'stage of cycle' Es: temporary equilibrium at constant growth.
(8)	Final Slope	has only a convexo-concave profile	has both convex slope (Bosching) and concave slope (Waldenhay)
(9)	Diagnostic feature Remarks	- peneplains	- Pediment and inselberg

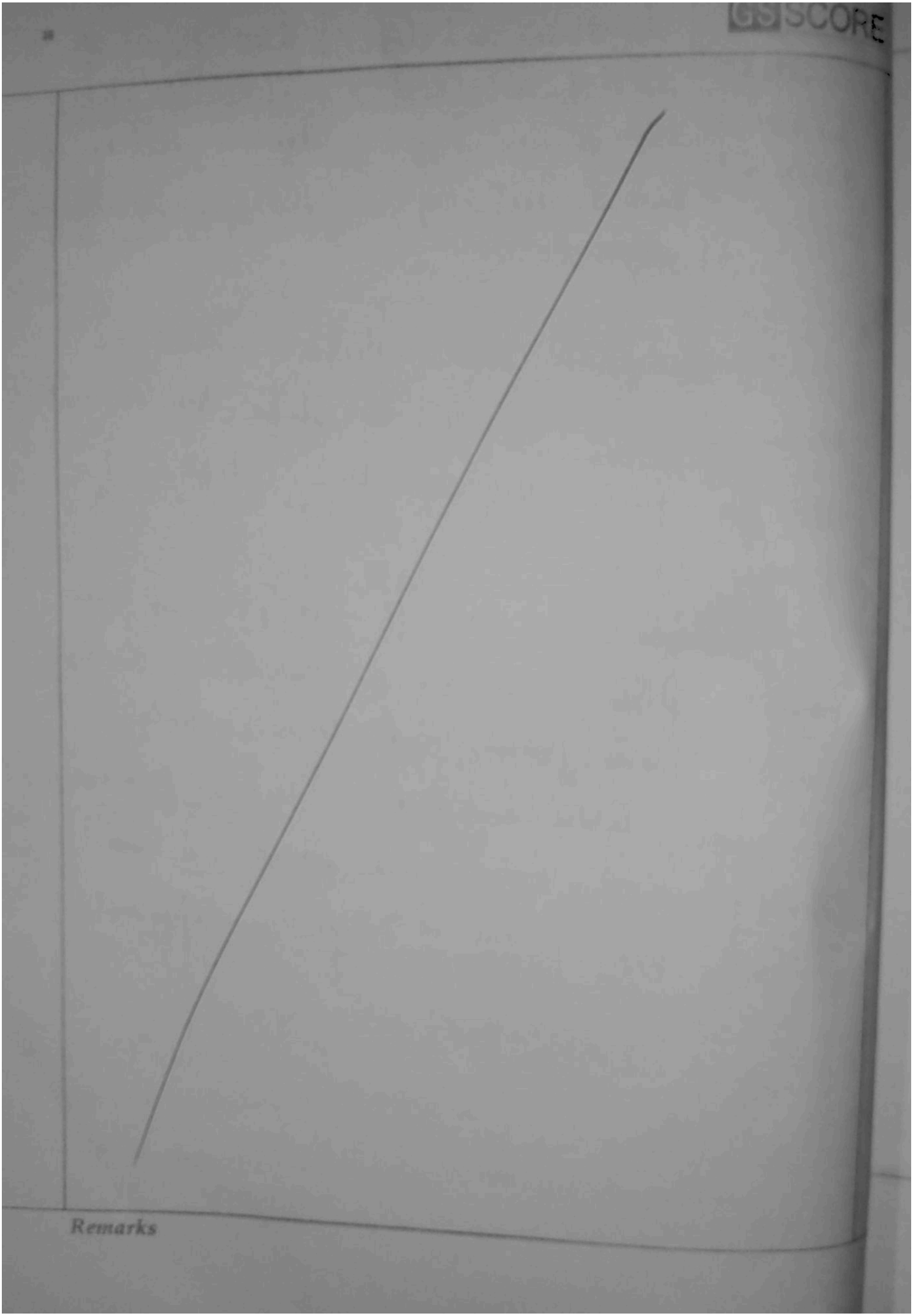
GS SCORE

(16)	System concept by BJL Berry and Chorley	landform and slope develop as closed system and move towards entropy maximisation	development of slopes under open system and hence entropy optimization

The Davisian slope evolution offered a time dependent concept in slope development whereas Penck was an time independent, process theorist.

However, the real life slope processes have more complexity and are a result of multiple factors than process and time. Role of climate (Peltier and Budel), tectonics (Horizama), Bio process (vegetation) and land use also impact the process of slope development

Remarks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Remarks

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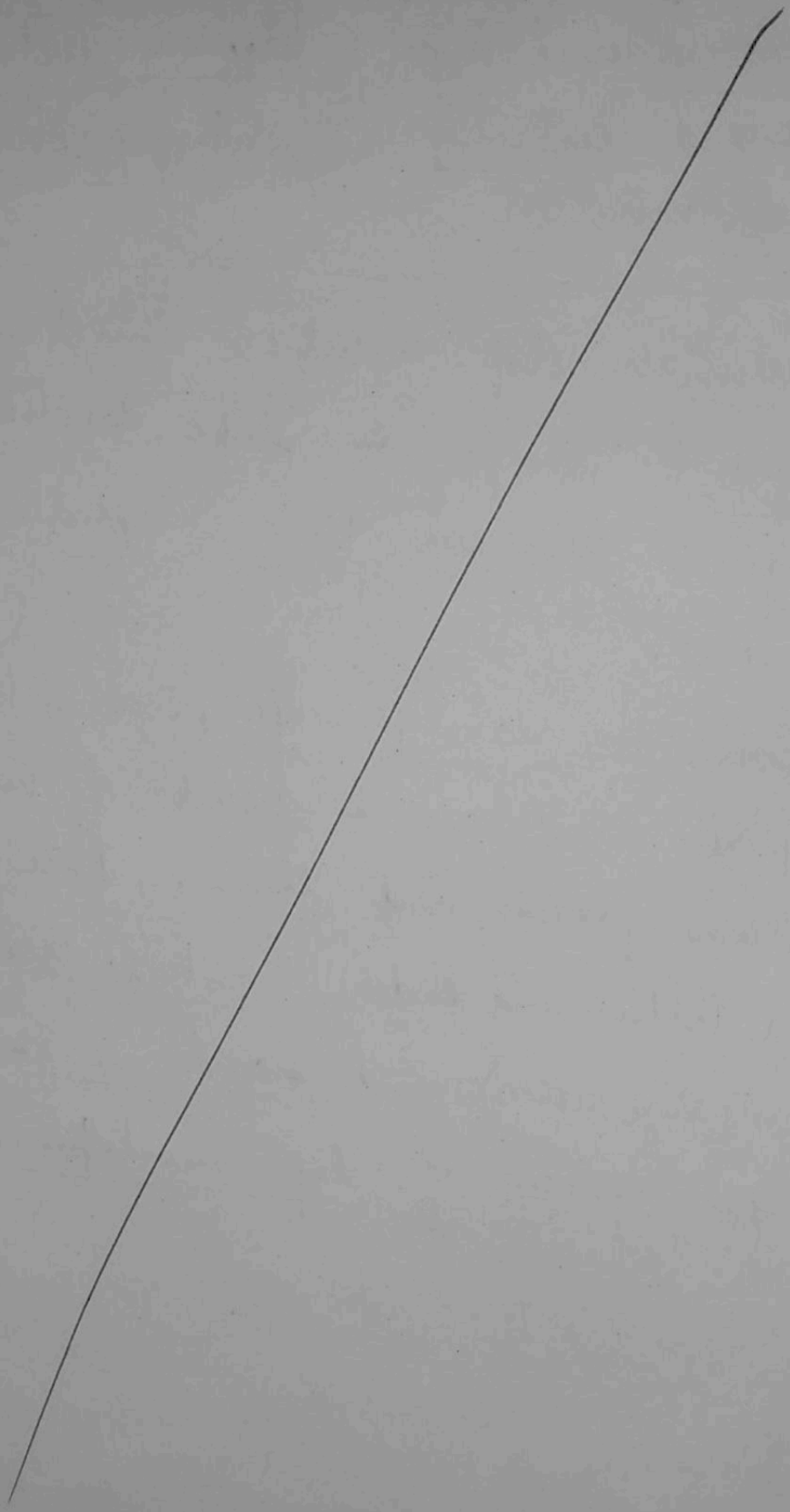

Remarks

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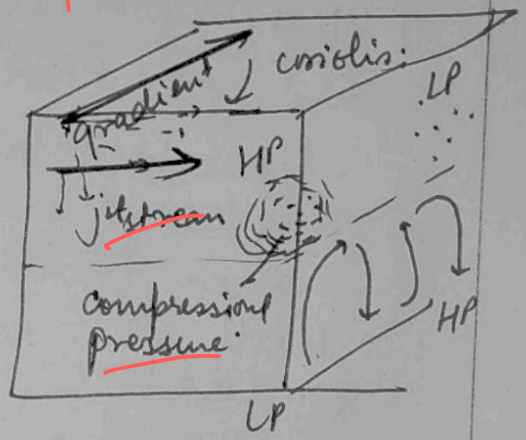
4. (b) Most scientists agree that climate change is making events driven by the jet stream worse. Explaining the phenomenon of jet streams, discuss how climate change affects the jet streams? (200 Words) (15)

Jet streams are the fast moving bands of air embedded in the upper tropospheric circulation and are found at the boundaries of the Hadley-Polar ferrel cells Hadle-ferrel & ferrel-Polar

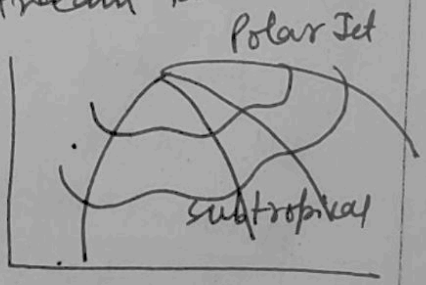
Phenomenon of Jet Stream

① General circulation of ferrel ~~heating~~ only upto lower tropsphere

② form a gradient in the upper atmosphere (15-20km)



③ However, due to a rotating earth, the atmosphere can shear. To conserve the angular momentum, the jetstream take meandering path with a frequency of oscillation called index cycle.



Types of Jet stream
- Permanent → Polar Jet, subtropical Westerly
- Temprasry → Polar Night, Tropical Easterly, Somali Jet

Remarks

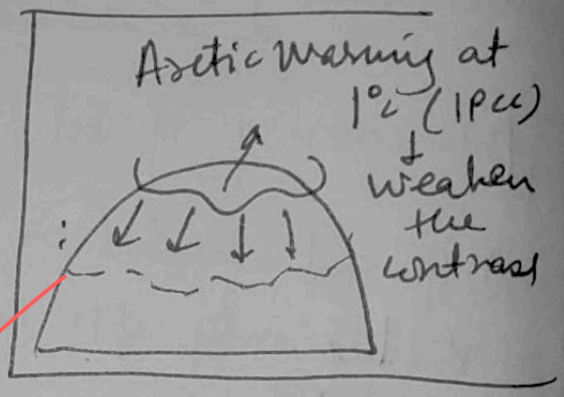
GS SCORE

Jet streams are vulnerable to the phenomenon of climate change both in mid-latitudes and also in lower latitudes.

Impacts of climate change on Jet stream

① Weakening of Polar Vortex and cold waves.

- due to weakening of thermal contrast between Polar and Ferrel cell.

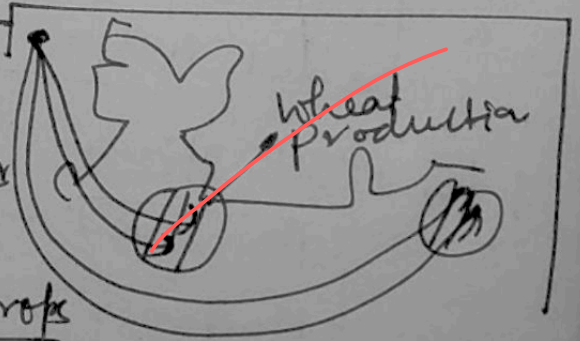


Eg: Cold Waves in Canada & US - 2020
- Temperature = -15°C
- even in region of Central Asia.

② Impact on temperate cyclonic rainfall

- Spread of subtropical westerly Jet stream till lower latitudes like India - affect the Winter rainfall - Western disturbances

Eg: 2022 January heavy rainfall in 5-15th January
- damage to the ripening of rabi crops like wheat, gram



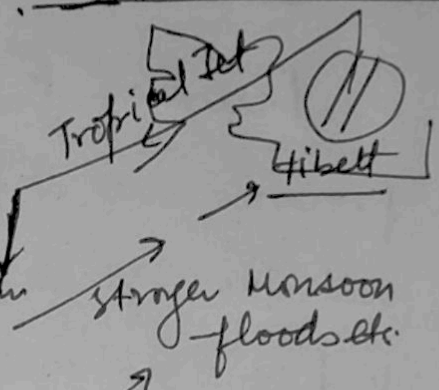
Remarks

GS SCORE

(b) Changes in the monsoonal regime due to variation in the localised Tropical Easterly Jet stream and Somali Jet:

Rootheshwaram's theory

→ Rapid heating of tibet due to melting of Hindukush Himalayan glacier (IGI MOD Report) leading to strong easterly jet.



This climate change has affected the jet stream phenomenon due to modifications in the air mass nature

10

Remarks

4. (c) Based on the specific physical conditions prevailing and the physical, chemical or biological activities involved, discuss some of the processes involved in soil formation. (200 Words) (15)

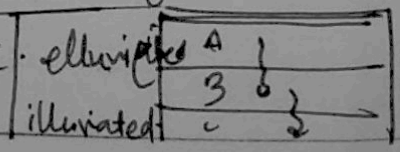
According to Dukochiev, soil formation processes are impacted by the physical conditions, and the physical-chemical biological activities making soil a dynamic entity.

Processes involved

① Weathering - insitu disintegration of rocks
↳ Impact by Physical conditions
(a) Cold and dry climate ⇒ Physical weathering
Eg: Corrosion, abrasion
(b) Warm and humid ⇒ Chemical weathering
Eg: Oxidation, carbonation

Also rate of weathering - depends on nature of rock (Physical strength, structure, jointing) and erosivity of agent.

② Leaching - physical condition → warm and humid climate
↳ seepage of soluble minerals from horizon A to B and then to C.



Remarks

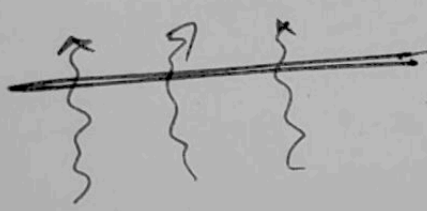
GS SCORE

Chemical factors - solubility of nutrients - Eg: Silicon oxide

(a) Laterisation
in warm and humid
① No chemical needed
② Hard Fe and Al oxides form 'pans'
Eg: Randi Patland
Reddish

(b) Podzolization
① - in cold and humid
② 'chelating' agents from pine
③ Fe and Al oxide dissolve and leach, grey silica compounds left Eg: Pine forests of Shimla.

(3) Capillary Action
↳ Physical : Hot/dry climate + soil moisture
↳ soil porosity to aid water rise



→ white Calcium pans
Eg: Reh, kallar chopan in Punjab, Haryana.

(4) Gleyification ① operates in the moist and damp soil condition (Physical)
② Presence of Chemical - Potassium Glauconite (green pitch)
③ Biological agent - Earthworm, detritivores etc.

Remarks

GS SCORE

Eg: Gley soils of Kari (Kerala Wetlands), Taiga soil

(5) Mineraligation – rapid conversion of humus into inorganic matter

Thus soil processes are an interplay of various factors. Lately anthropogenic factors have also influenced it. Eg: Intensive farming under green Revolution.

Can be linked to Agriculture with Soil degradation & Conservation

Remarks

GS SCORE

Section - B

5. (a) 'Energy mix is the need of hour'. Elucidate with examples. (150 Words) (10)

According to IPCC 6th AR, thermal (coal + oil + gas) based power accounts for almost 70% of global energy consumption.

Challenges due to dependence on single source

① the exhaustible and limited reserves to serve the Inter generational equity issues.
Eg: In India coal reserves expected to last for 30-100 years.

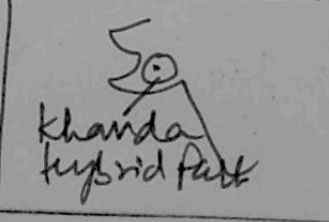
② Increasing global temperature from thermal power plants predicting 1.5°C temperature rise by 2100.

③ Increasing consumption demand especially in developing economies.
Eg: India and China expected to have largest population by 2050.

The step towards energy mix

① Increasing the share of renewable energy from current ~25% (globally) to almost (40-45%) by 2100.

② setting up hybrid energy system
Eg: India - Solar + Wind energy



Remarks

GS SCORE

(3) Shift to ocean energy reserves which have been lesser used
Ex: UK - high scale OTEC and wave energy consumption (~52% of energy IEA report)

(4) Moving towards nuclear energy fuel with other features. of wind park etc
Ex: India's Kudankulam - can have Prospects of wind energy development

Benefits

(1) Reduce the carbon footprint of present system
(2) Resource equity across space and time

India's Panchamrit commitment @ COP 26 also aims to diversify to 50% renewable energy by 2140.

5

Remarks

GS SCORE

5. (b) "Man-induced famines are becoming more common than nature-induced ones." Comment. (150 Words) (10)

According to FAO, famine is an event of acute food shortage due to natural and man induced factors which globally affects 2.5-3 bn people.

Reasons for nature induced famines

① Disasters like floods, droughts
Eg: 1943 Bengal famine due to drought

② Rise of pest attacks
Eg: The Plague of 1980s.

However, in recent times, famines have become a socio economic phenomenon and are generally human induced

Cause for this are -

① Skewed crop choices without agro-climatic planning leading to crop failure

Eg: Marathwada - failure of sugarcane yield in 2019 - Maximum farmer suicide

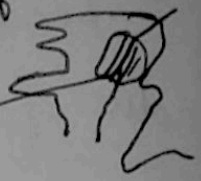
② Increasing anthropogenic disasters of floods and drought in intensity and frequency

On the backdrop of Globalisation by means of factor of famine

Remarks

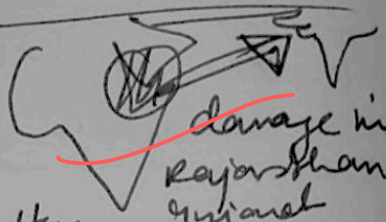
GS SCORE

Eg: Bangladesh – 2022 floods – loss of 2.5-3 lakh ha of rice fields due to Brahmaputra floods.



(3) Increasing incidences of pest attacks due to human induced climate change.

Eg: 2020 Locust storm due unusual Arabian sea warming (Min of Agriculture



damage in Rajasthan, Gujarat – 5000 ha

(4) Skewed food distribution and high leakages.

Eg: Despite PDS system, India has 25% of global hunger burden (FAO Reports)

Careful crop choices by land and climate assessment and improvement in price affordability and quantity of food with focus on micro nutrient is needed. India's Poshan Abhiyan can help

S1

Remarks

GS SCORE

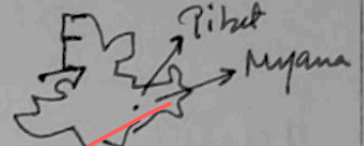
5. (c) Religion and settlement have long been closely interconnected (150 Words) (10)

Religion has been one of historical factors for the spread of civilization and has affected the settlement patterns.

Dispersion of settlements

① spread of religion by contact or by coercion diffusion led to spread of settlements

Eg:

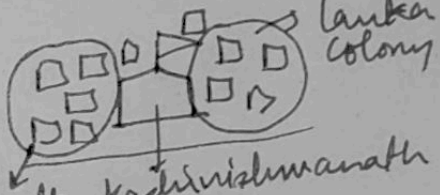


spread due to Buddhism. → srilanka

Settlement patterns and religion

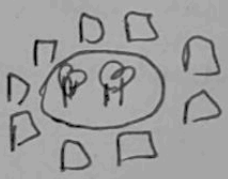
① creates compact and nucleated pattern around places of importance

Eg: Settlements around temples.



② Impacts the nature of rural settlements due to some feature of 'Nature Worship'

Eg: Circular pattern in sacred groves by "Bon Bibi" trees in Bengal.



Religion and features of settlement demography and economy

Remarks

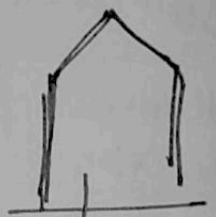
GS SCORE

① generally small scale tourism economy around religious settlement
Eg: Ajmer sharif economy ~ 80% dependent on tourism

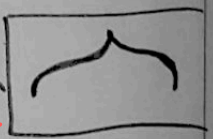
② cohesive social structure in the settlements with social capital
Eg: Mathura-Vrindavan

Religion and Styles of Settlement

① Impact on building architecture
Eg: Europe- Iberian style buildings


Pointed arch

② Delhi Chandni Chowk - area Jama Masjid
b features of Islamic Arch



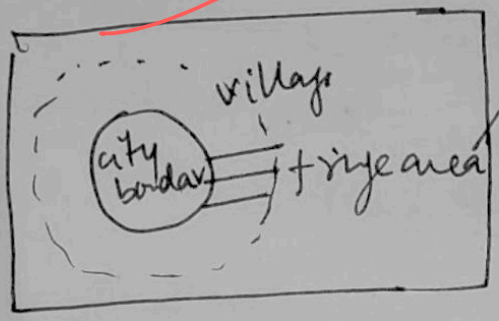
Thus religion has been closely linked to the settlement pattern of both urban and rural areas even in the present time.

Remarks

GS SCORE

5. (d) 'Rural-Urban Fringe'. (150 Words) (10)

According to R.P Mishra, rural urban fringe is a zone of transition between the rural and urban areas.



Features ① administratively Rural

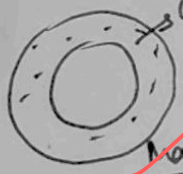
② Economically → Urban

③ Culture - Mixed values of urban + Rural.

Process of growth of Urban-Rural fringe

① Development happens through urban sprawl and growth of city due to migration

② 5 Stage development



change in the work choice → changes in the land use → chages in econic standards → commutter town (people travel to urban CBD)

Market gardens

↓

edge city

Chays in the fring area as per RP Mishra.

Eg: Gurgaon - 'Gurugram'

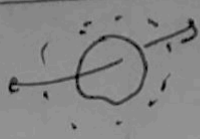
Problems of fringe area

① Uncontrolled urban sprawl leading to slums and squatter settlements

Remarks

GS SCORE

Eg: Mumbai - Dharavi Slum



(2) Issue of waste generation and environmental degradation

Eg: The Delhi Bhalswa landfill - 65 meter high ↑ at 10 mt/annum

(3) Social unrest due to conflicts, sexual crimes etc.

It is necessary to plan the growth of fringe areas through proper counter magnets to control the random spread.

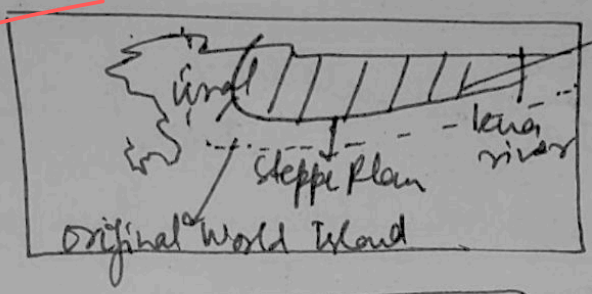
5

Remarks

GS SCORE

5. (e) Concept of heartland (150 Words) (10)

According to Halford Mackinder, Heartland is an area of Eastern Europe which has following boundaries



Eastern Europe
- Russia,
Poland,
Hungary
Czech Republic
etc.

Evolution of idea of Heartland

① Mackinder in his 'geographical pivot of history' gave of 'World Island' - a larger region than Heartland

② According to him, - who controls the world Island, controls Eurasia and the world.

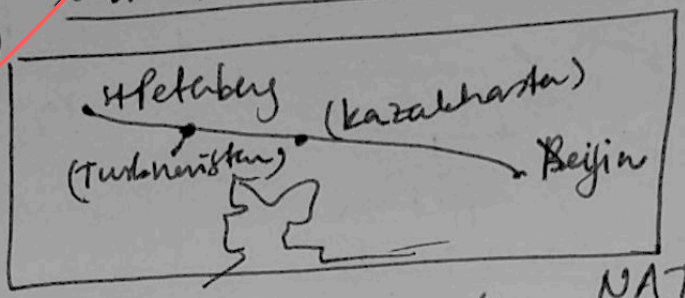
③ Mackinder predicted that either Germany or Russia would control if post WW I.

④ However defeat of germany, made him modify his World Island — toward a smaller heartland and predicted rise of Germany in this area the WW II in 1930s was pretty much fought in this zone

Remarks

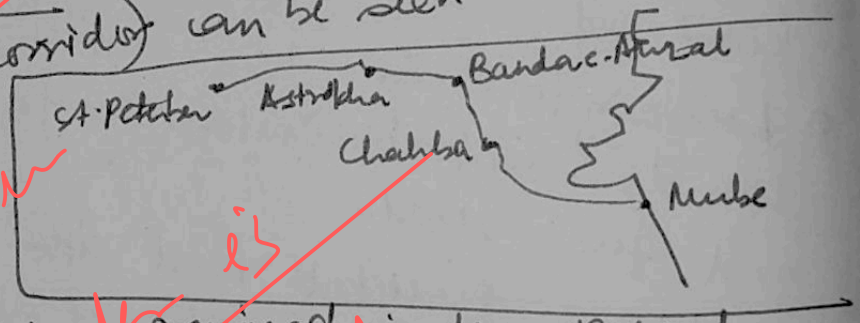
Significance in the present time

① The geopolitics of China seen in the revival of Silk Route initiative in the region



② Increased tension between the NATO Russia for the control.

③ India's connect North policy with central Asian neighbours and the INSTC (International North South corridor) can be seen



Pan Heartland has remained in the present times due to its resource richness in oil, natural gas and coal.

To write how geography is revived in present time by the NATO & Russia

GS SCORE

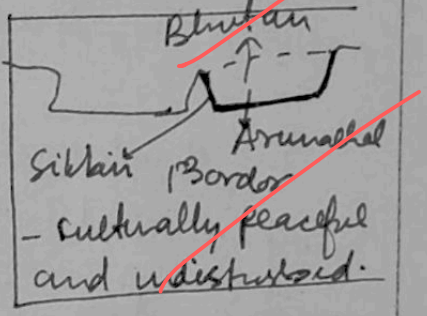
7. (a) Discuss the generic classification of international boundaries. How does it differ from the morphological classification? (250 Words) (20)

the Hartshorne-Whittlesey classification gave two basis to under international boundaries- the generic classification and morphological classification

(A) The genetic / generic classification is based on the process of formation of international boundaries generally by the man-made process of boundary demarcation

It is of following types -

(a) Antecedent boundaries - These boundaries develop prior to the development of culture and thus are relatively peaceful due to cultural congruency.

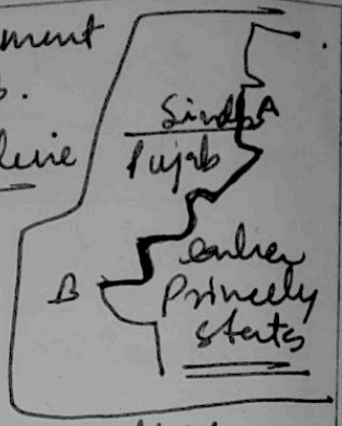


(b) Superimposed boundaries - These boundaries are demarcated after the development of cultures and hence can often lead to disturbed conditions.

Remarks

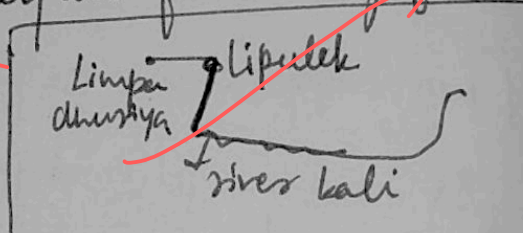
GS SCORE

(i) Subsequent - still have some element of prior administration setup.
Eg: Indo-Pak Radcliffe line



(ii) Totally superimposed - completely disregard the cultural aspects
Eg: the African scramble leading to conflict like Libya, Egypt, Sudan etc

(L) Consequent boundaries - They are formed by following some natural features Eg:-



Indo Nepal boundary

The generic classification differs from the morphological classification as the morphological classification is on the basis of visible physiographic factors.

Examples of this are-

① Crestline boundaries - (based on mountain)

Crestline boundary

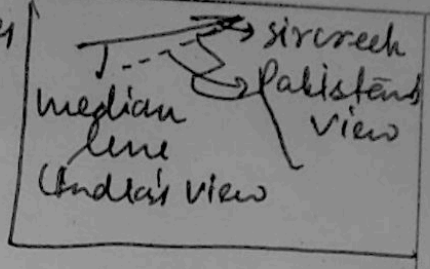
Eg: Pyrenees between Italy and France

② Thalweg / Median line - on water bodies and rivers.
Eg: Rio Grande → USA, Mexico

Remarks

GS SCORE

(3) Eg: Indo Pak - Sir Creek boundary



(3) Geometrical features

(a): Arc of the river - Eg- Rive Amur (Russia / china)

(2) Latitudes and longitudes → Eg: Vietnam = 17° N are ~~south~~

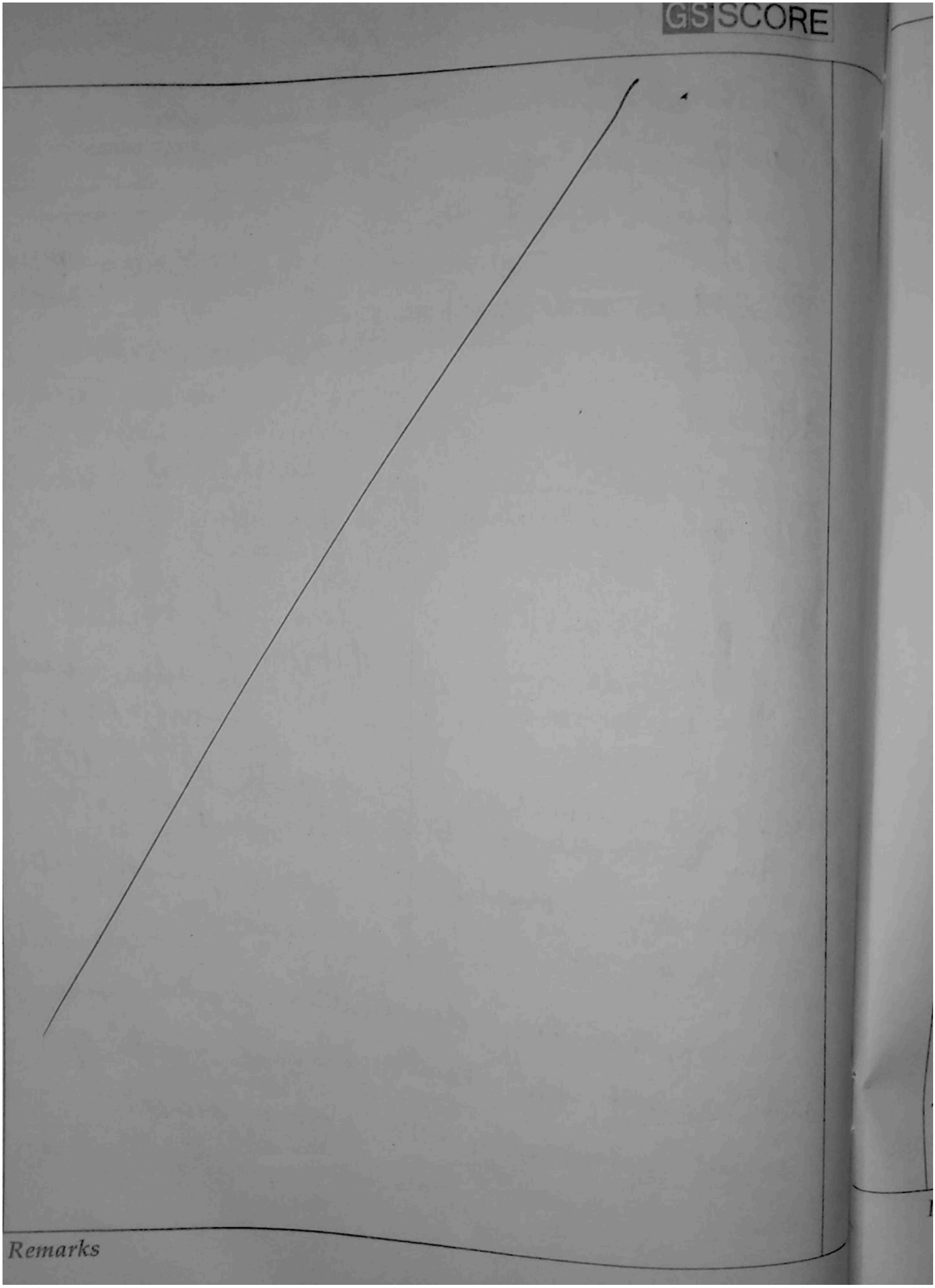
→ Eg: korea = 39° N (North Korea vs South)

Differences

Genetic	Morphological
(1)- Generally human imposed	-generally follow natural features
(2)- clear demarcation (Eg: Indo china Middle sector (Uttarkhand))	-can lead to 'zone of frontier' (Eg: Indo-china western sector (LAC))
(3)- Can be restored on the basis of agreements	- difficult to reach agreements
(4)- generally centripetal tendencies	-generally centrifugal issues.

Any boundary demarcation should take into account the locally-relevant needs of social capital along with goal of economic development

Remarks

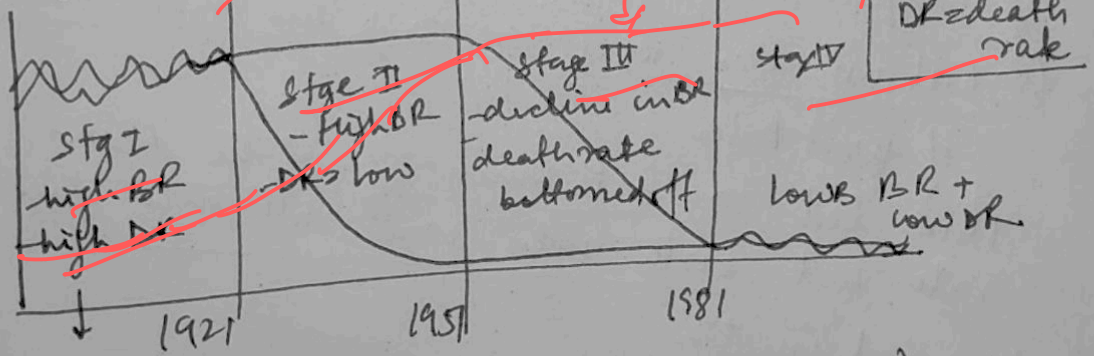

GS SCORE
Remarks

7. (b) Discuss the Demographic transition theory with special reference to India. (200 Words) (15)

The demographic transition theory by Warren Thompson and Frank Notestein explains the sequential changes in the demographic parameters of birth rate and death rate, thus explaining the population growth development.

The model is based on III stages (or sometimes IV) and explains the general population development of many countries like USA, Britain, India etc

Demographic transition Theory



- Primitive societies
- backwardness
- Malthusian factors operate

development begins
- Medical revolution
- higher stand of life
- Arsene Mill + JS Dumont theory

Stable societies

Remarks

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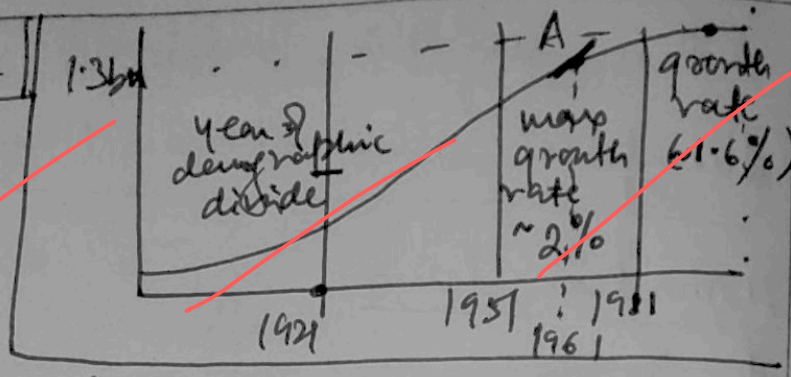
In India's reference



Stage-I.

① Early 20th century. → low health and development indicator

② Positive checks of Malthus like famine & Plague (1843) (1770s) operated.

Stage II and III

① Population explosion due to improvement in healthcare facilities - (Swasthya Suraksha Yojana etc.)

② Improved standard of living in post independence

③ Out migration in (1970s-80s) due to oil boom of West Asia

These led to bottoming-off of the death rate but birth rate was still high due to social inertia

Stage IV

① Decline in birth rate - some due to planning for population, some due to sterilization in (1980s) (2000 policy)

Remarks

GS SCORE

② Post 1991 - better Quality of life led to 'social capillarity' of Arsene Dumont

③ Acceptance of small families with behavioural and income change and globalisation

However, the model fails to capture some features of India's population

① A uniform progression has not been seen in the North and South states in India

② Does not capture the role of migration patterns in population change in recent times

④ Recent issue of declining TFR levels (Urban = 1.6, Rural = 2.1) as per NFHS 5, show trends of mortality reversal.

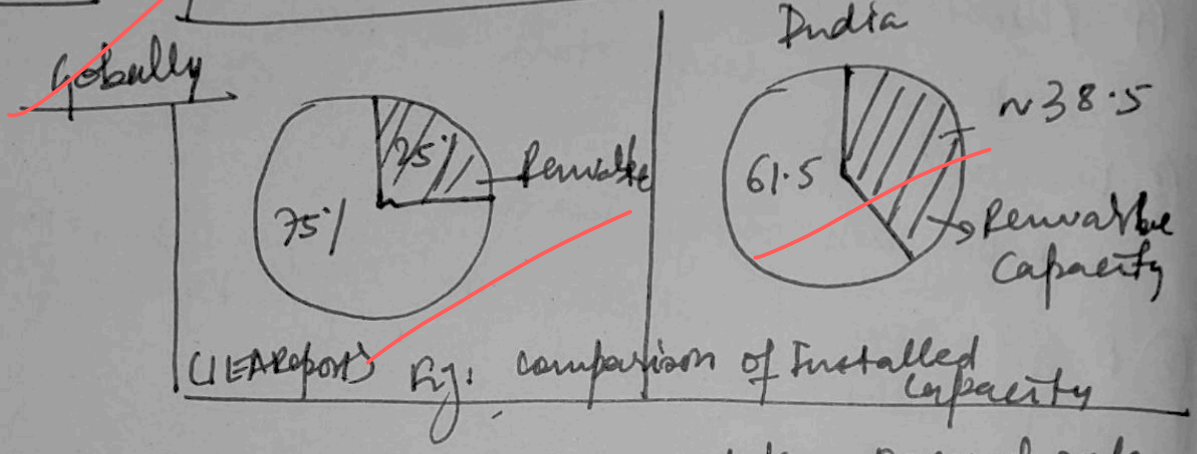
The model has been a descriptive study of population evolution. Recent population concerns need redressal at the socio-cultural levels

Remarks

GS SCORE

7. (c) What is Energy diversification? Discuss its viability for the developing countries like India. (200 Words) (15)

Energy diversification refers to reduced dependence on coal, oil and gas based conventional sources and moving towards a mixed basket of renewable and non renewable.



CLEAReport) Fig: comparison of Installed Capacity

According to IPCC 6th AR, at the present rate of fossil fuel combustion, global temperature is expected to reach 2.4°c by 2100. thus there is an urgent need to switch to diversification as committed under latest COP 26.

Viability for Developing Countries like India

① Energy security - meet the energy requirment of rising population (expected to reach 1.5bn by 2030 as per UN World population Report)

Remarks

GS SCORE

② Improved grid stability - due to bundling of renewable and non-renewable ensuring 24x7 supply of power.

Eg: Hybrid energy park at Kutch ↓ Khavda
largest solar+wind park

③ Availability abundance - being located in the tropics, round the year solar and wind surplus

Eg: International Solar Alliance - 1TW solar power by 2030 for sun-rich contries mainly (India + France = co-chair)

④ Reduced emission of Greenhouse gas and carbon dioxide (16 - 10% from power plants)
Eg: NASA OMI data - India = 15% of global SO_2 hotspots

Challenges

① Issue of Climate Justice - began their development at a later stage than Britain, USA etc. hence need more time to transition to cleaner sources.

② Issue of higher initial cost in terms of infrastructure, raw material etc
Eg 80-82% of solar panels by India are imported from china.

Remarks

GS SCORE

(B) India has lower cummulative and percapita emission (<1%) than other developed nations hence bear the brunt of climate change created historically.

The developed nations should showcase the principle of Trusteeship and enable the development of green energy sources via Green climate fund of UNFCC in countries like India.

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Remarks