NEXT IAS

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(To be filled by candidate)

Name of Candidate : VIKASH YADAV

Roll No. : MT22GERA001

Registration Number : NIAS220001850 **Date of Examination :** 19-06-2022

Exam Centre : Old Rajinder Nagar ☑ Online ☐

CSE (Main) Test Series - 2022

Test-01

GEOGRAPHY OPTIONAL

PAPER-I (PHYSICAL GEOGRAPHY)

BY ALOK RANJAN SIR | Founder Digmani Education (IAS/PCS)

Time Allowed : Three Hours **Maximum Marks :** 250

QUESTION PAPER SPECIFIC INSTRUCTIONS

(Please read each of the following instructions carefully before attempting questions)

*There are **EIGHT** questions divided in **Two sections** and printed in **ENGLISH**.*

*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 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 authorized medium. No marks will be given for answers written in medium other than the authorized one.

Attempts of questions shall be counted in sequential order. Unless struck off, 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.

(For filling by Examiners only)

Q. No.	Page No.	Maximum Marks	Marks	Total	Signature
1. (a)	4	10			
1. (b)	4	10			
1. (c)	4	10			
1. (d)	4	10			
1. (e)	4	10			
2. (a)	15	20			
2. (b)	19	15			
2. (c)	22	15			
3. (a)	25	20			
3. (b)	29	15			
3. (c)	32	15			
4. (a)	35	20			
4. (b)	39	15			
4. (c)	42	15			
5. (a)	45	10			
5. (b)	45	10			
5. (c)	45	10			
5. (d)	45	10			
5. (e)	45	10			
6. (a)	55	20			
6. (b)	59	15			
6. (c)	62	15			
7. (a)	65	20			
7. (b)	69	15			
7. (c)	72	15			
8. (a)	75	20			
8. (b)	79	15			
8. (c)	82	15			
		Grand Total			

EVALUATION INDICATORS		Remarks			
		Excellent	Good	Average	Needs Improvement
Content	Relevance				
	Economy of words				
	Examples/Current Linkages				
Presentation	Language				
	Structure				
	Sequencing				
	Novelty				

Observations:

IMPORTANT INSTRUCTIONS

CANDIDATES SHOULD READ THE UNDERMENTIONED INSTRUCTIONS CAREFULLY. VIOLATION OF ANY OF THE INSTRUCTIONS MAY LEAD TO PENALTY.

DONT'S

1. Do not write your name or registration no. anywhere inside this Question-cum-Answer Booklet.
2. Do not write anything other than the actual answers to the questions anywhere inside your QCA Booklet.
3. Do not tear off any leaves from your QCA Booklet, if you find any page missing do not fail to notify the supervisor/invigilator.
4. Do not leave behind your QCA Booklet on your table unattended, it should be handed over to the invigilator after conclusion of the exam.

DO'S

1. Read the Instructions on the cover page and strictly follow them.
2. Write your registration number and other particulars, in the space provided on the cover of QCA Booklet.
3. Write legibly and neatly. Do not write in bad/illegible handwritings.
4. For rough notes or calculation, the last two blank pages of this booklet should be used. The rough notes should be crossed through afterwards.
5. If you wish to cancel any work, draw your pen through it or write "Cancelled" across it, otherwise it may be evaluated.
6. Handover your QCA Booklet personally to the invigilator before leaving the examination hall.

QUESTION PAPER SPECIFIC INSTRUCTIONS

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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 medium other than the authorized one.

Word limit in question, wherever specified, should be adhered to.

Attempts of questions shall be counted in sequential order. Unless struck off, 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.

SECTION-A

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1. Answer the following in about 150 words each: **[10 × 5 = 50 Marks]**

(a) Why volcanic eruptions are environmental hazards?

(b) How global pressure belts effect the regional climate. Examine

(c) Differentiate between characteristics of Chernozem and Chestnut soils.

(d) What do you understand by Marine heatwaves? Discuss how it impact the marine ecosystem.

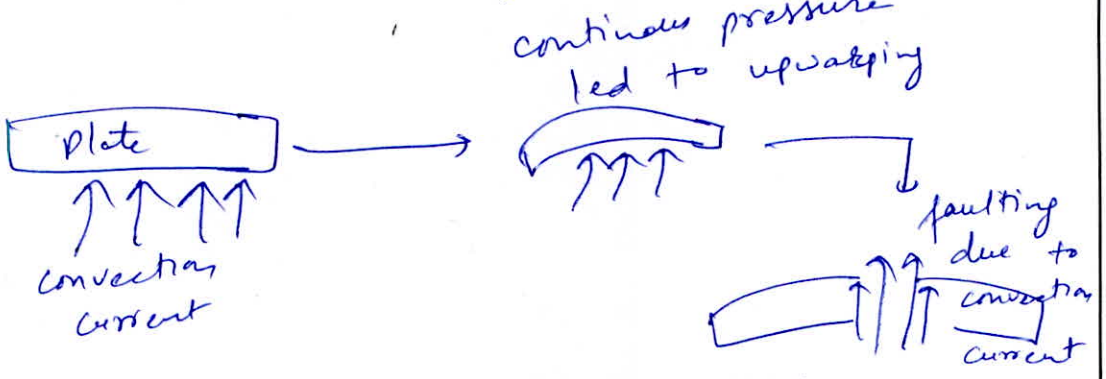
(e) What is a bio-geochemical cycle? What are its essential features.

(a) Volcanic eruptions happens due to divergent & convergent plate boundaries and tectonic activities in terms of endogenic processes associated with them.

Environmental hazards – as humans have no control over these hazards and they are purely creation of earth's endogenic processes so termed as environmental hazards.

Volcanic eruptions –

(i) Divergent boundary –

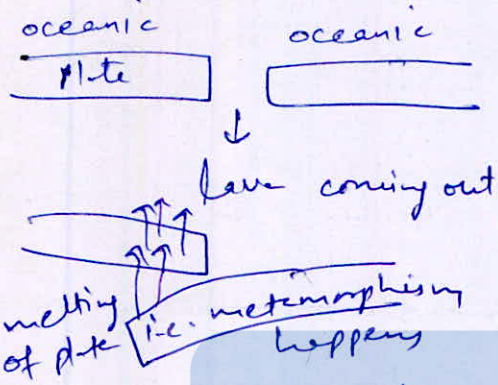


this faulting resulting into breaking of plate and lava starts coming out of it i.e. mid-oceanic Ridge in Atlantic ocean is an example of it.

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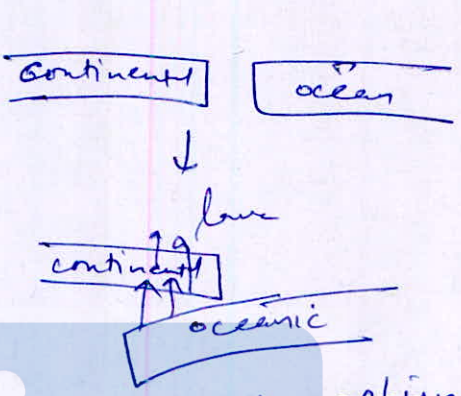
(ii) Convergent plate boundaries —

ocean-ocean convergence



one plate goes beneath the other

ocean-continent convergence



due to metamorphism

↓

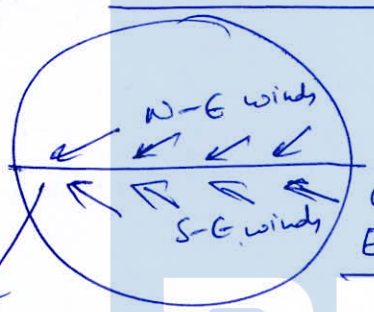
both forms volcanic islands, sometimes fold mountains etc.

Since, humans can't control this process & its entirely in the hands of nature resulting in volcanoes rightly termed as environment hazard.

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(b) Global pressure belts lies around equator, 30° North & South, 60° and poles affecting regional climate in different ways.

(i) Equator — Sun overheats it throughout the year resulting in low pressure belt and convection resulting into clouds & consequent rainfall (known as 4 o'clock rainfall).

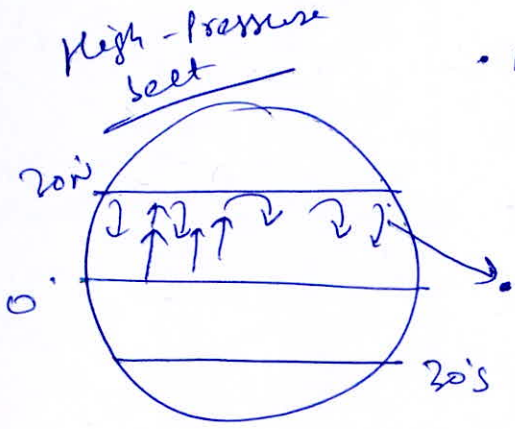


also called as Doldrums

→ enervating climate due to humidity

→ lightning, thunderstorms are daily phenomenon

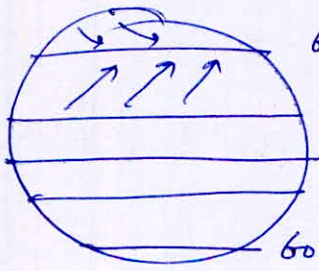
(ii) 30° North & South (Horse Latitudes) :-



- Mainly movement of sun happens between $23\frac{1}{2}$° N to $23\frac{1}{2}$° S
- most deserts are found here due to subsidence air & stable conditions.
- highest temperatures are found in these regions.

Candidates must not write on this margin

(iii) 60° North & south (sub-polar low pressure belt) :-



→ slant rays of sun as it is heat deficit region

→ region of temperate cyclones (continous rainfall for days)

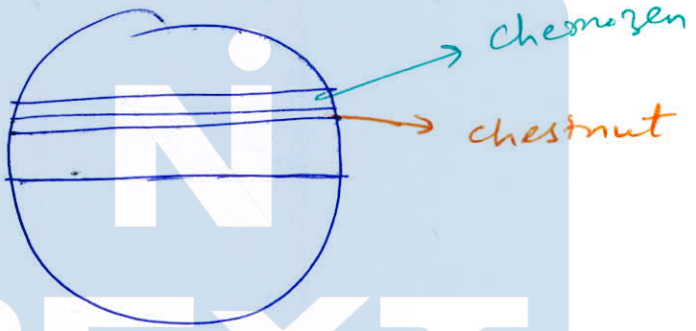
most suitable climate for human development.

(iv) Poles - are very cold due to extreme temperatures, very less insolation, sometimes convectional precipitation happens.

Cold pressure belts do affect their regional climate by way of precipitation, cyclones etc.

Candidates must not write on this margin

(c) Chernozem & chestnut soils are found in and around tropical - temperate transition zone i.e. 30-40° and are classified under Pedocals (i.e. found in drier areas)



Globe

Difference between the two -

(i) Chernozem are found in upper temperate region where chestnuts are found in lower temperate region i.e. towards tropical side.

(ii) Chernozems are associated with black soils of Ukraine and are quite fertile in nature whereas chestnut are relatively less fertile.

Candidates must not write on this margin

(iii) Chernozem are slightly acidic in nature whereas chestnut are alkaline in nature

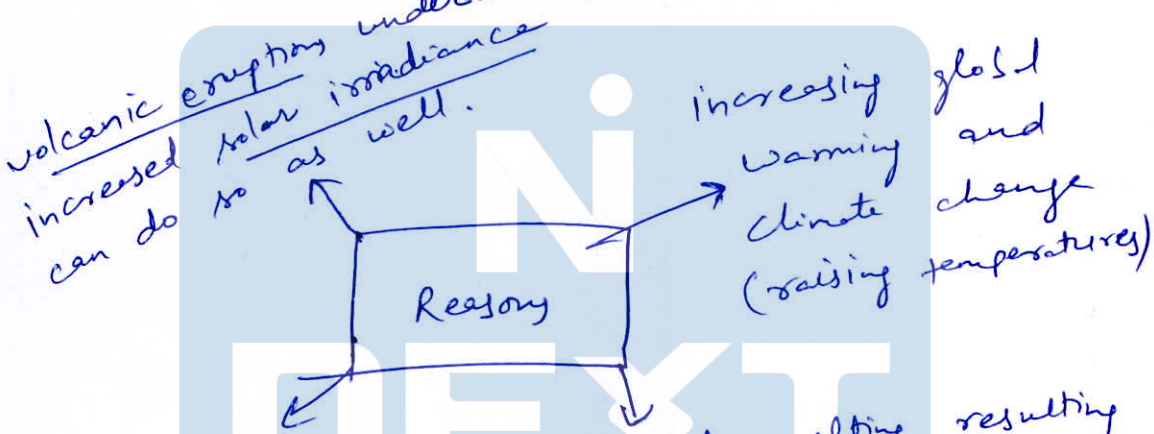
(iv) amount of sand in chernozems are less comparitive to chestnut soils (sandy in nature)

Both the soil are important as Chernozem is associated with 'bread basket of world' regions whereas Chestnut are associated with fertility upon use of fertilisers & irrigation.

Candidates must not write on this margin

(d) Marine heatwaves can be defined as steep rise in temperature of water bodies resulting in marine heatwaves in the water bodies.

Reasons for marine heatwaves —



Impact of these on marine ecosystem —

(a) it has the potential to severely damage the marine ecosystem and reducing biodiversity of oceans by way of coral bleaching (as happening near Australian Coast i.e. in Great Barrier Reef).

Candidates must not write on this margin

(b) it can result in extinction of some species, particularly if exposed to continous marine heatwaves for longer period of time.

(c) it will disturb the whole ecosystem, consequently issues in food web of the oceanic waters.

U.N., governments as well as all other related organisations need to come forward to address issue of marine heatwaves so that oceans continue to flourish & support human development in every possible way.

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(e) Biogeochemical cycles can be defined as any natural pathway by which essential matter are circulated.

(i) Gaseous cycle – like water cycle, oxygen cycle, nitrogen cycle etc.
In these cycles, we use to get essential gases for the earth through various processes. These are perfect as there is no loss during the cycle.

(2) Sedimentary cycle – for soil & different type of rocks i.e. Phosphorous cycle, sulphur cycle, Calcium cycle etc. These are imperfect as some nutrients do get lost during cycle.

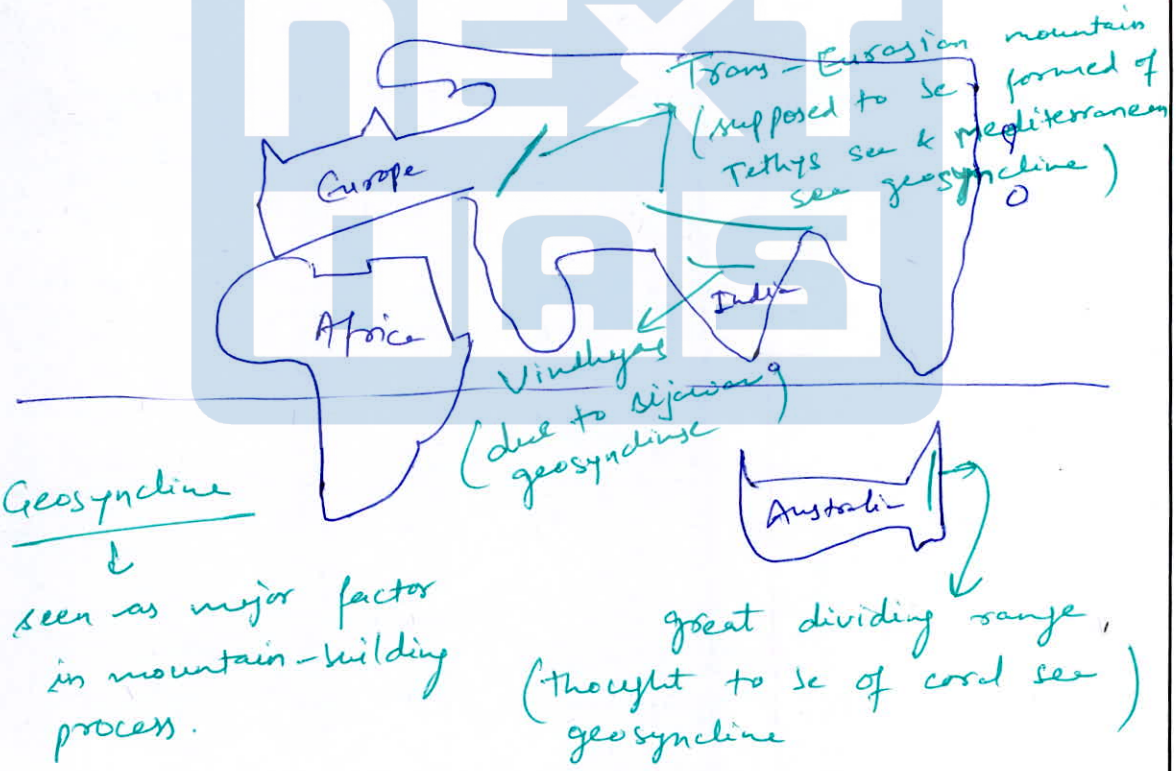
These cycles helps in ensuring availability of gases & sediments for life, facilitate storage of short-term & long-term elements for future uses etc.

Candidates must not write on this margin

2.(a) "Mountains are destined along the trough containing a thick accumulation of sediment". Evaluate the above statement with the various theories of Geosyncline. [20 Marks]

Candidates must not write on this margin

James & Dana, used geosynclines for the Ist time, later Kober used the concept of geosynclines while explaining his theory of mountain building, eventually Arthur Holmes tried to explain the origin of geosynclines through convection current. The concept of geosyncline was older concept (even before & Wegner's theory) & were seen as major reason for formation of fold mountains.



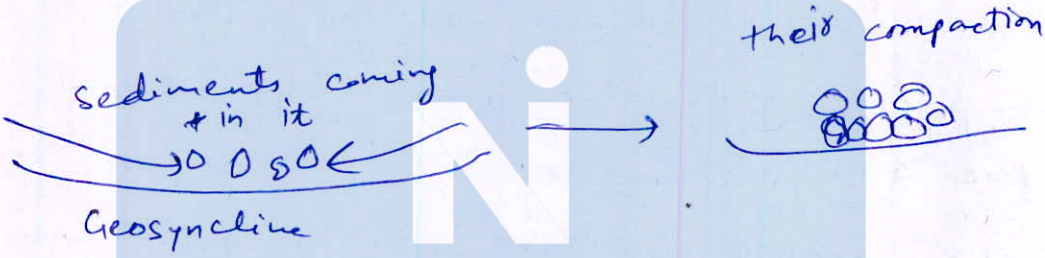
Map

Geosynclines – also important in providing information of marine sediments on fold mountains, continous sedimentation for their parallel series of ranges & location of mountains.

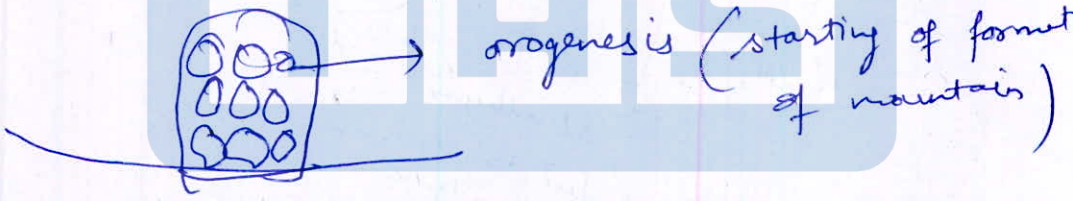
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Kober theory of mountain building - the driving force of his theory was the thermal contraction of earth and following are stages of his theory -

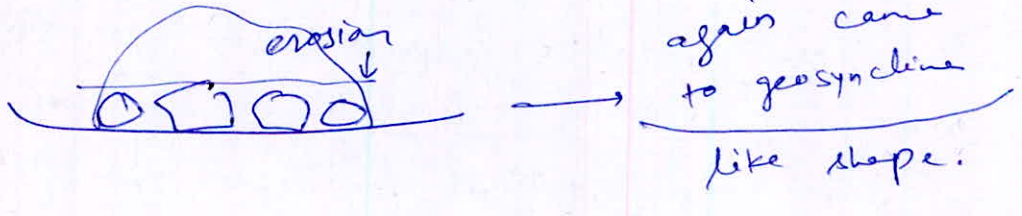
(i) Lithogenesis - where sediments came, deposited & became compacted.



(ii) orogenesis - then these compact sediments starts getting folded & faulted due to endogenic force of earth



(iii) Glyptogenesis - due to exogenetic forces like erosion by water, wind & other processes the mountain gets eroded and end up a surface like geosyncline



Candidates must not write on this margin

Evans theory — His theory talked about presence of geosyncline between two landmasses (like Tethys geosyncline) which ultimately forms mountain, or they may be found in front of a mountain or a plateau etc.

Criticism of geosyncline theory —

(a) geosynclinal formation given by Arthur Holmes was itself not well established thereby raising apprehensions over further process of mountain building.

(b) geosyncline theory didn't talk about Rockies & Andes type of fold mountains i.e. fold mountains in coastal areas/regions can't be explained using this theory.

(c) Koser talked about thermal contraction of earth as driving force behind formation of these mountain but in reality we know that plate movement & convection current in mantle is responsible for this.

Candidates must not write on this margin

Geosynclinal theory is no more relevant when it comes to mountain building process as Plate Tectonics theory deals with this in detail (by talking about plate movement, different type of boundaries like convergent, divergent etc. and driving force as convection current in mantle).

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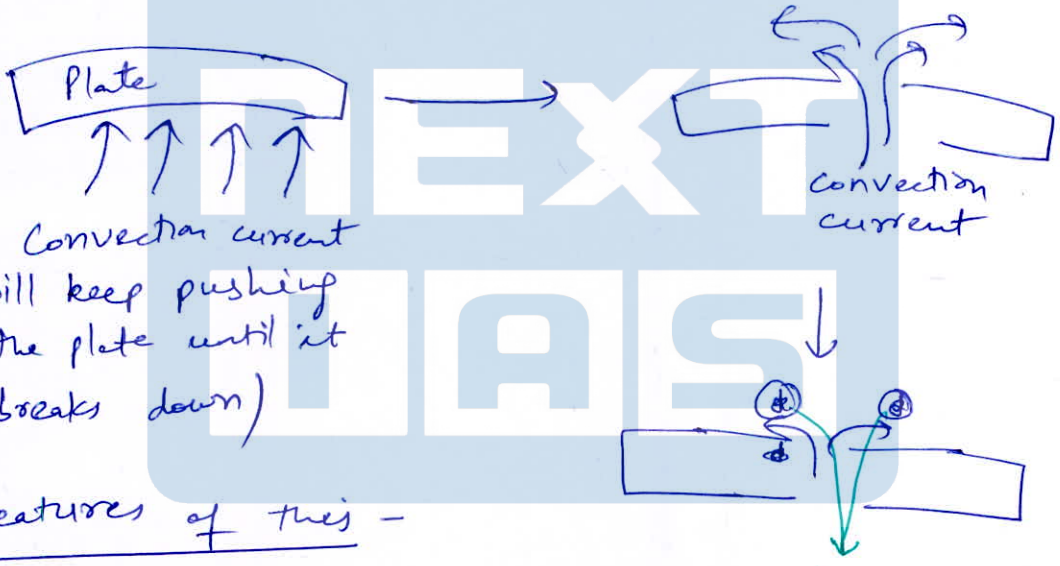
2.(b) Explain how the hypothesis of sea floor spreading forms the basis of the new theory of plate tectonic. **[15 Marks]**

Candidates must not write on this margin

Sea floor spreading hypothesis

was given by Harry Hess in 1928 which talked about new crust, ridges at the point of divergent boundary etc.

Concept of sea floor spreading – Harry Hess laid emphasis on convection current as the main driving force.



Features of this –

(a) new lava will keep getting deposited on ridge & old one will keep moving away

(b) almost equal amount of lava will get deposited on each side of ridge.

(c) the plate/crust will work in conveyer belt system

Candidates must not write on this margin

where new crust will be formed at ridge while older crust will be subsumed at trenches.

(d) it does not found any oceanic sediment less than 1.5 million years old whereas continental sediments were as old as 160 million years old suggest continents as static & ocean floor regularly recycling.

After his theory, Wegner said that convection current in the mantle is the driving force of continents and his Continental Drift Hypothesis was correct. After the theory of Harry Hess, concepts like Palaeomagnetism get attention due to the magnetic properties of rocks remembering their location as well as location of poles at the time of their formation, Concept of Geomagnetism etc. resulted in Plate Tectonics theory.

Plate tectonics theory talked about movement of plate boundaries due to convection current in mantle, oceanic

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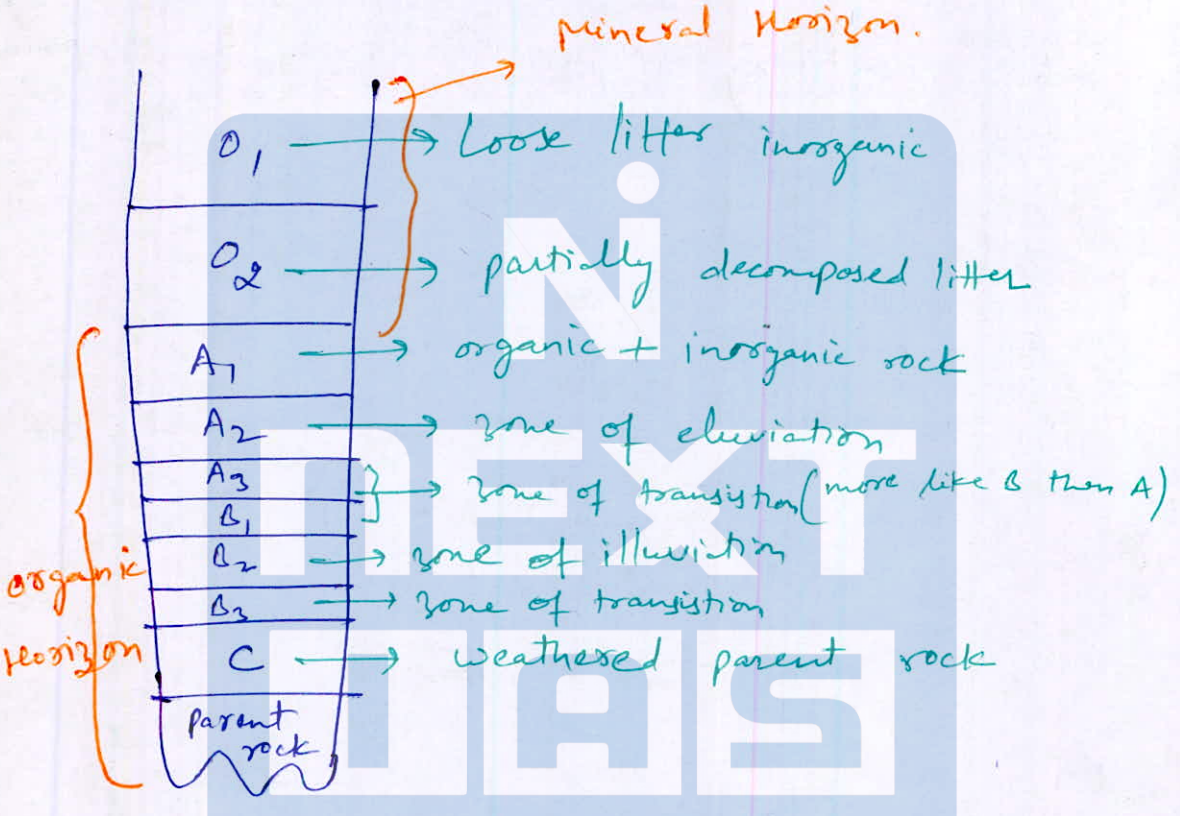
floor going beneath resulting in several features like volcanic islands, earthquakes etc.

So, the theory or concept of sea floor spreading became the turning point in ~~Earth's~~ continent's movement study which eventually explained by Plate tectonics

2.(c) What is soil horizon and Distinguish between organic and mineral horizon . How soil horizon related to soil fertility. Explain. **[15 Marks]**

Candidates must not write on this margin

Soil horizon is basically the vertical variation of soil and the process through which it goes.



Vertical variation of soil

The process from parent rock to A1 are organic horizon where soil goes through a lot of changes due to rock property, processes happening during weathering in terms of leaching of minerals downwards etc. Whereas O_1 & O_2 are mineral horizon mainly relies on humus & detritus material found over earth surface

Candidates must not write on this margin

Soil horizon related to soil fertility –

(a) parent rock has a lot of characteristics of soil in terms of texture, pH, permeability etc., rock composition etc. affecting its property of water percolation, minerals in it etc.

(b) zone of illuviation & eluviation happens due to leaching & capillary processes resulting in mixing of organic and inorganic matter too affects its fertility

(c) Mineral horizon – is mainly related to humus & detritus material as in temperate areas these make soil slightly acidic & good for cultivation whereas in humid region bacterials devoids soil of humus etc. resulting in less fertile soil

Candidates must not write on this margin

Soil fertility depends on a lot of factors, time taken in developing soil, role of climate etc.

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3.(a) Comparison between method of climatic classification between koppen and Trewartha. [20 Marks]

Candidates must not write on this margin

Candidates must not write on this margin



Candidates must not write on this margin



Candidates must not write on this margin



3.(b) Which areas of oceans and land are associated with high net primary productivity ? How is the net primary production on land related to climate. **[15 Marks]**

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Candidates must not write on this margin



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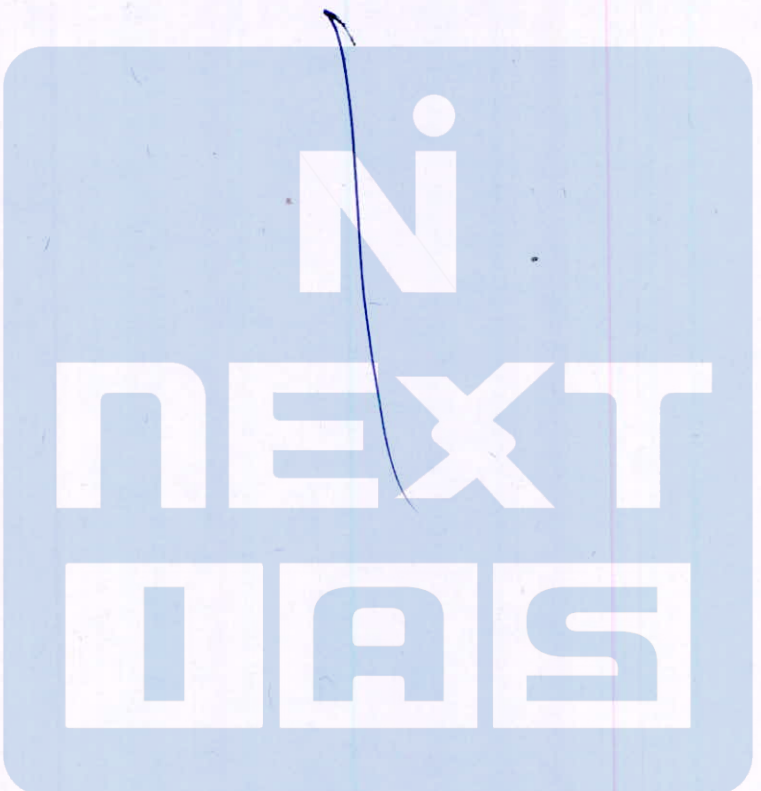
3.(c) Monsoon forest and midlatitude deciduous forest are both deciduous but for different reasons. Compare the characteristics of these two formation classes and their climates. **[15 Marks]**

Candidates must not write on this margin



Candidates must not write on this margin

Candidates must not write on this margin



4.(a) Explain the channel – bed morphology and channel pattern. [20 Marks]

Candidates must not write on this margin

Candidates must not write on this margin



Candidates must not write on this margin



Candidates must not write on this margin



4.(b) Peneplain is not as 'plain' as it seems rather it is the manifestation of the different process acting all together. Comment. **[15 Marks]**

Candidates must not write on this margin

Candidates must not write on this margin



Candidates must not write on this margin

4.(c) What is ocean biological pump? If there were no bacteria in the ocean, do you expect to to find a more efficient sink of atmospheric carbondioxide through the ocean biological pump? Explain. **[15 Marks]**

Candidates must not write on this margin

Candidates must not write on this margin



Candidates must not write on this margin



Candidates must not write on this margin

SECTION-B

5. **Answer the following in about 150 words each:** **[10×5 = 50 Marks]**

(a) How does a ridge and valley landscape arise? Explain the formation of the ridges and valleys.

(b) What is particulate Matter? How does PM affect human health.

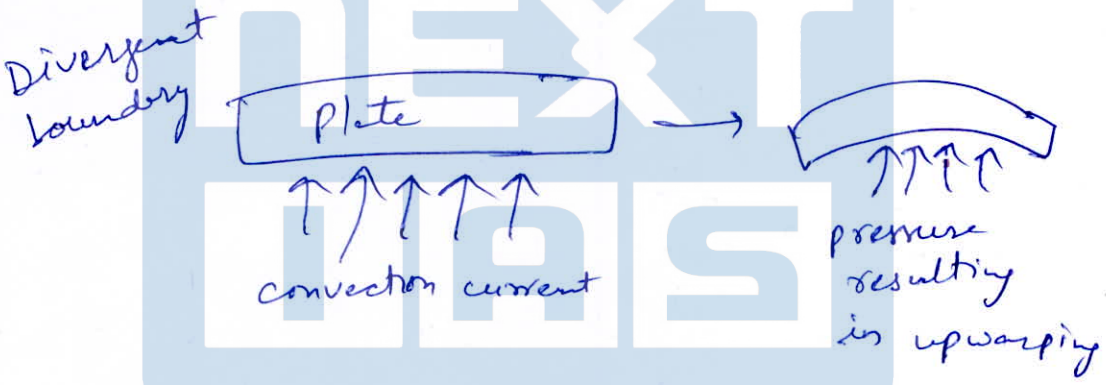
(c) What is adiabatic principle? Why is it important.

(d) Compare and contrast the terms exogenic process and endogenic process

(e) Identify factors that can make a soil acidic or alkaline.

(a) Landform creation is an interplay of earth's endogenetic & exogenetic process.

Ridge formation — mainly along divergent plate boundaries.

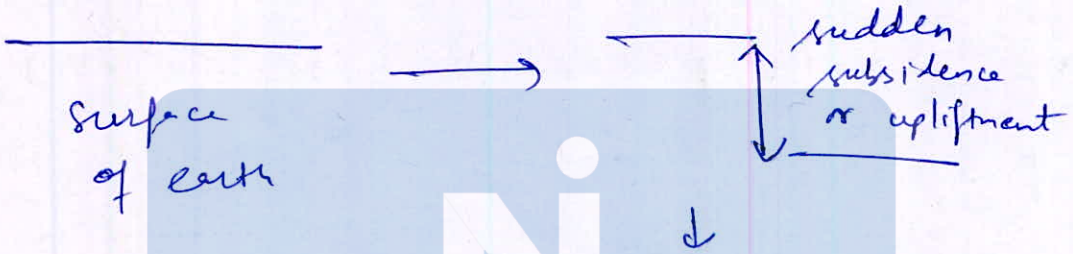


- Mid-oceanic ridge of Atlantic ocean is an example of divergent boundary

Candidates must not write on this margin

Ans

Valley landscape — can happen due to uplifting of one parts of surface thereby resulting in 2nd becoming valley.



↓

This will result in creation of a valley.

Valley & ridge formation happens mainly due to endogenetic process of tectonic activity on earth surface.

Candidates must not write on this margin

(b) Particulate matter are fined particles of micrometre size which are often released by industries, vehicles etc. as a form of pollution.

Types of Particulate matter

- **PM 2.5** (of particles less than 2.5 micrometres) → Very dangerous as it is difficult to get detected due to its small size.
- **PM 10** (of particles less than 10 um) → it is also dangerous.

Effect on human health –

Effect
- elders & children do get severely affected and effects their memory, learning etc.
- increases respiratory issues among people (even among healthy ones)
- more harmful to asthmatic patients
- increases the risk of cardio-vascular diseases

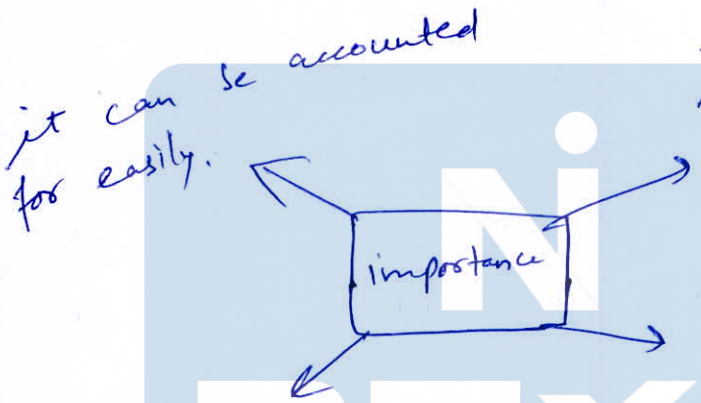
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Graded Response action Plan (GRAP) plan of Delhi government, WHO released new guidelines on pollutants, particularly PM 2.5 & PM 10 shows their severity in affecting human health. So, government need to move towards cleaner fuel sources, technology augmentation to arrest these pollutants, honey-comb like structure to attract these, etc. will help us in arresting these pollutants

Candidates must not write on this margin

(c) Adiabatic process is a closed system where there is no exchange of heat happens with external environment

Its importance —



But adiabatic process & principles do not exists in real life, as environment is like ecosystem concept which is open system and keeps interacting with outside system.

A close system is a negative feedback as is the case for adiabatic processes whereas open

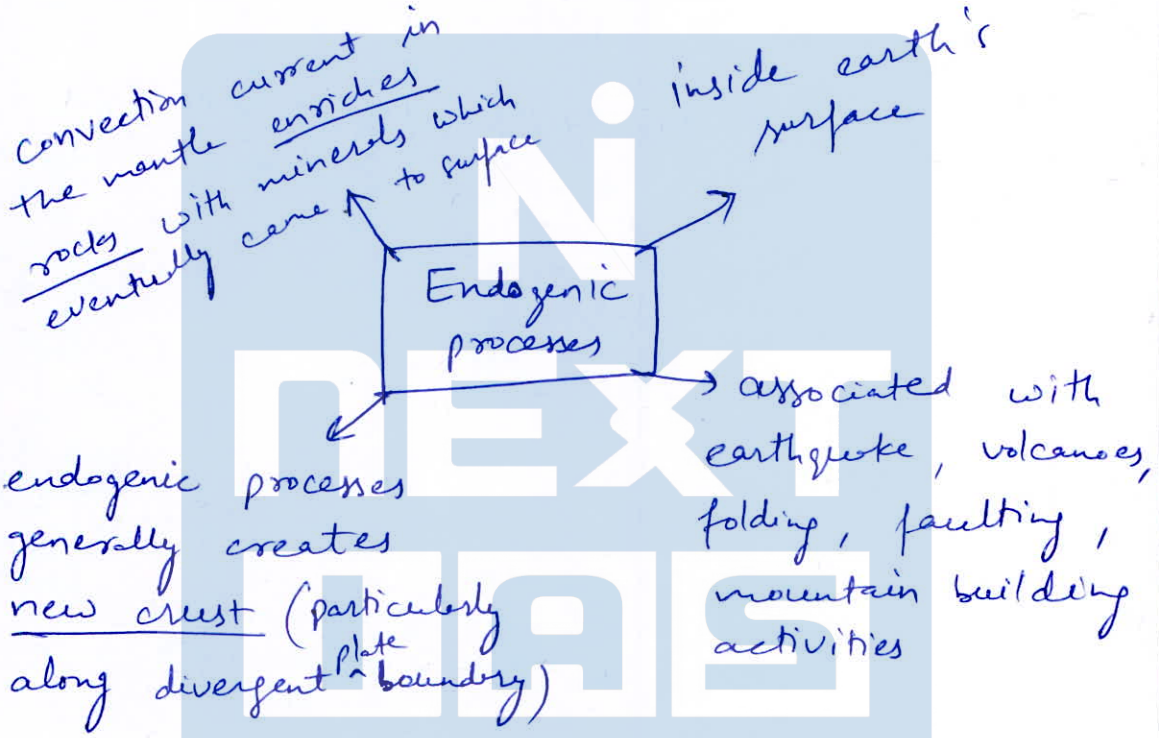
Candidates must not write on this margin

systems are positive feedback as they balance themselves through interaction without outside environment.

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(d) Endogenic processes are those processes which are operating inside the surface of earth like plate movements, upliftment of surface, convection current in the mantle.



Exogenic processes are those processes which happen on surface of earth like erosion by wind, water, glaciers etc. and these are mainly related to denudation, balancing out endogenic process, tends to reduces large mountains to relic mountains etc.

Candidates must not write on this margin

Both these processes are key to maintain earth's isostatic balance as one uplifts / creates the crust i.e. endogenic procss while other reduces / destroys the crust i.e. exogenic procss resulting in maintaining earth's isostatic equilibrium. so both the processes are necessary for the cycles of the earth.

Candidates must not write on this margin

(e) Soil is uppermost layer of earth, forms due to interplay of lot of factors like weathering, climate, biota etc.

Factors that make a soil acidic/alkaline -

(a) parent weathered rock do have its own texture, pH so this rock can make a soil either acidic or alkaline

(b) the process of evapotranspiration, particularly in arid & semi-arid regions resulting in capillary action and consequent rise of salts to the earth's surface makes soil alkaline (salt pans found in deserts are an example of this).

(c) the process of sequioxide in temperate soils results in release of acid thereby turning the soil into acidic one.

(d) use of excessive chemical fertilizer results in making soil either acidic or alkaline, more so alkaline in nature.

Candidates must not write on this margin

(e) continous acid rain for long time with regular frequency may turn the soil acidic in nature.

(f) process like leaching (which usually dissolves salt in the soil) can produce acidic soil i.e. Lateritic type of soils.

Extremely acidic or basic soils are not good for cultivation, so we need to promote organic farming, reducing use of chemical fertilizers, use of gypsum etc. to ensure that soil remains conducive for agriculture.

Candidates must not write on this margin

6. (a) What is the Atlantic Meridional Overturning Circulation (AMOC) ? What causes the AMOC to weaken and How does warming of Indian Ocean affect AMOC.

[20 Marks]



Candidates must not write on this margin



Candidates must not write on this margin



Candidates must not write on this margin



Candidates must not write on this margin

(b) What are translocation processes ? Explain using the terms eluviation and illuviation. How calcium carbonate translocated in soils. **[15 Marks]**

Candidates must not write on this margin



Candidates must not write on this margin



(c) Describe the orographic precipitation process. What is a rain shadow? Provide an example of the rain shadow effect. **[15 Marks]**

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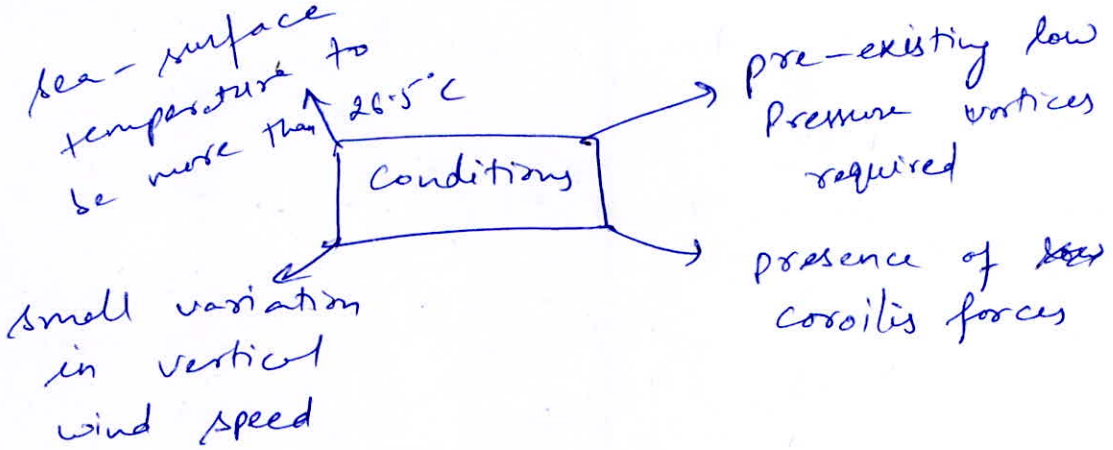
7. (a) Define cyclone and anticyclone . How does air move within each ? What is the direction of circulation of each in the northern and southern hemispheres? What type of weather is associated with each and why ? **[20 Marks]**

Cyclones are low-pressure regions with air coming inside it and with the presence of coroilis force they gets spiral resulting in formation of cyclones mainly between 5-25° N & South.

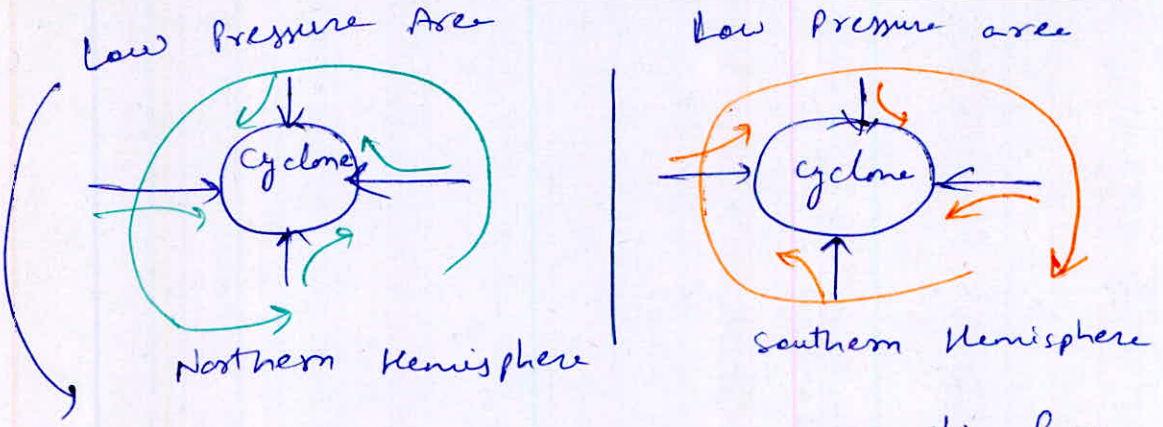
Cyclones –



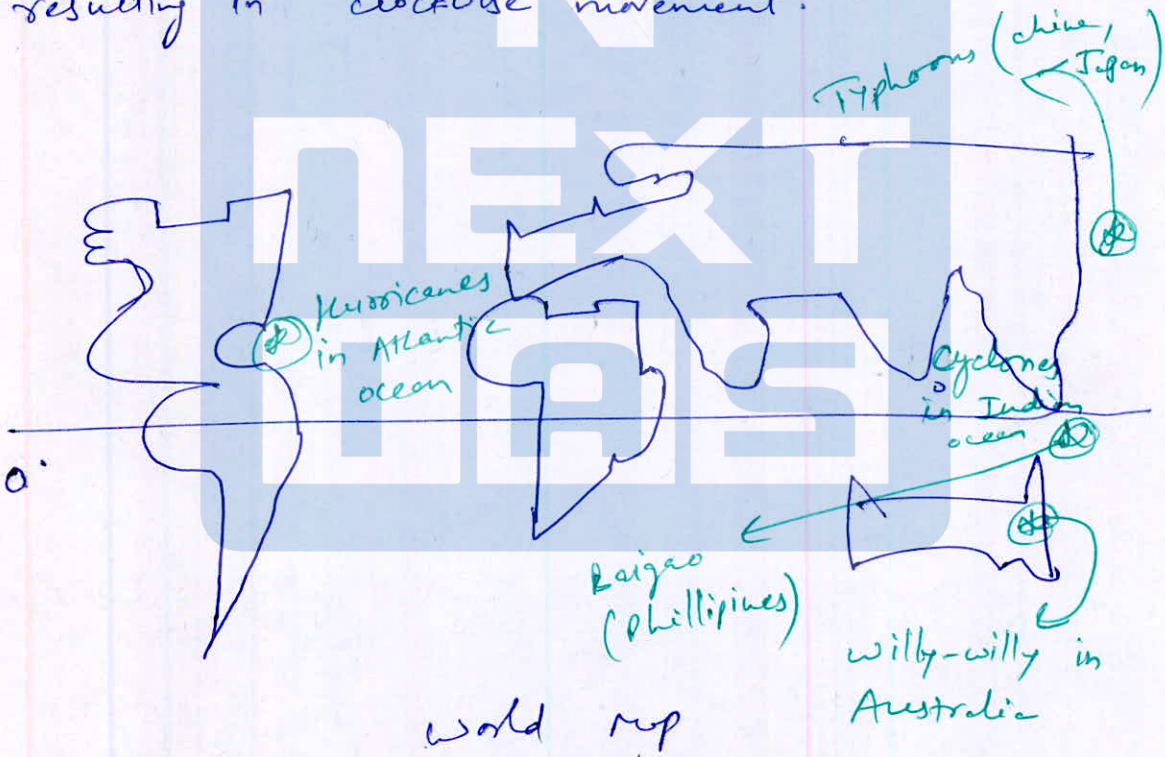
Conditions required for formation of cyclone –



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so air will converge & then coriolis force will move right in northern hemisphere resulting in counter-clockwise where the force will move towards left in southern Hemisphere resulting in clockwise movement.



World Map

Weather associated with cyclone -

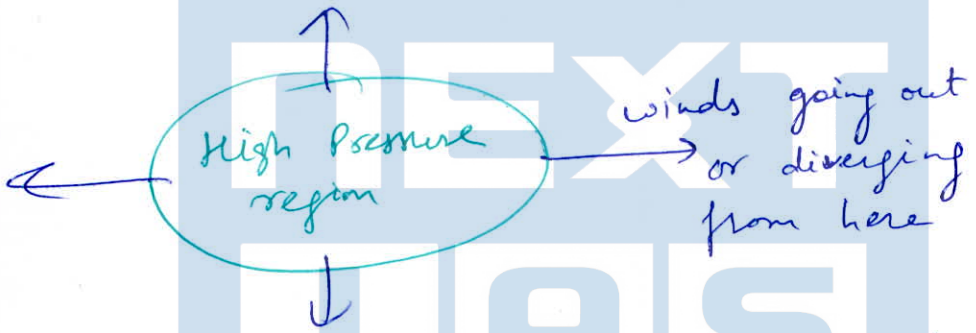
(a) there is sudden drop in pressure gradient resulting in V-shaped isobars, consequently resulting in heavy rainfall, thunderstorms etc.

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(b) due to latent heat of condensation, cumulonimbus clouds form resulting in heavy rainfall, lightning etc.

(c) high wind speeds due to steep pressure gradient occurs during cyclones.

Anti-cyclones — are just opposite of cyclones, formed due to High pressure, subsidence of air downwards as divergence of wind takes place from here.



These are conditions of anti-cyclone, & they move clockwise in Northern Hemisphere and counter-clockwise in Southern Hemisphere

Weather associated with it — is generally open skies, dry subsiding wind, clear skies, stable conditions resulting in clear weather without much disturbance i.e. desert type of climate or weather is often associated with anti-cyclonic process.

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Cyclones & anti-cyclones are natural processes which are being tinkered by anthropogenic factors like climate change & global warming resulting in more & more unique, retreating, re-curving cyclones with increased intensities & frequency. So, we need to keep a check over all this to ensure better living for humanity.

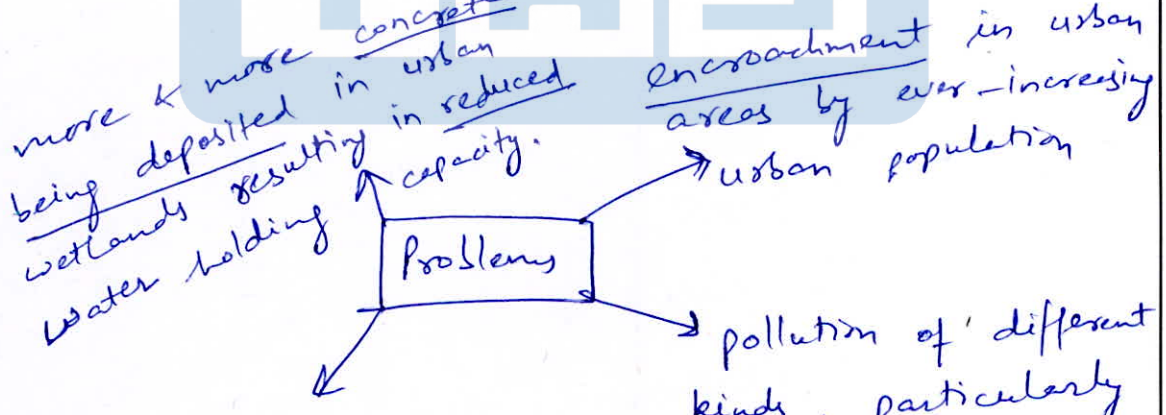
(b) Wetlands as a tool for flood control and prevention. Discuss. **[15 Marks]**

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Wetlands are natural or artificial reservoirs of water, nutrients, organisms, resulting in one of the most important biodiversity reservoirs of earth.

Tool for flood control & prevention — Wetland can act as reservoir for the extra-water during rainfall, it will also act as reservoir of water which can be expanded without much effort to hold more water, can be created artificially as well.

Problems faced by wetlands in doing so —



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All these factors restricts the role of wetlands in addressing the issue of flood in the country, more so in urban areas as these factors tend to distrub the hydrological cycle of the region.

Steps need to address this :-

- geo-tagging of wetlands and regular inspection of their health, proper dredging etc.
- ↓
- appointing a special official or body to overlook wetland related affairs
- ↓
- arresting pollution, particularly plastic pollution in urban areas will reduce instances of eutrophication & will maintain health of wetlands
- ↓
- addressing the encroachment by proper planning of residential areas

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Along with wetlands, emphasis should be laid on creating flood-plain zones, rainwater harvesting so that the excess pressure over wetlands to control & prevent flood can be reduced, need to focus on climate change as well in order to arrest increasing frequency & intensity of wet & dry spells and consequent flooding issue.

(c) Describe the inter- relationship of man and marine resources. [15 Marks]

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Marine resources provides humans with a lot of resources like sea food, oil & natural gas, oysters, seagrasses, energy resources in terms of tidal energy, wave energy etc.

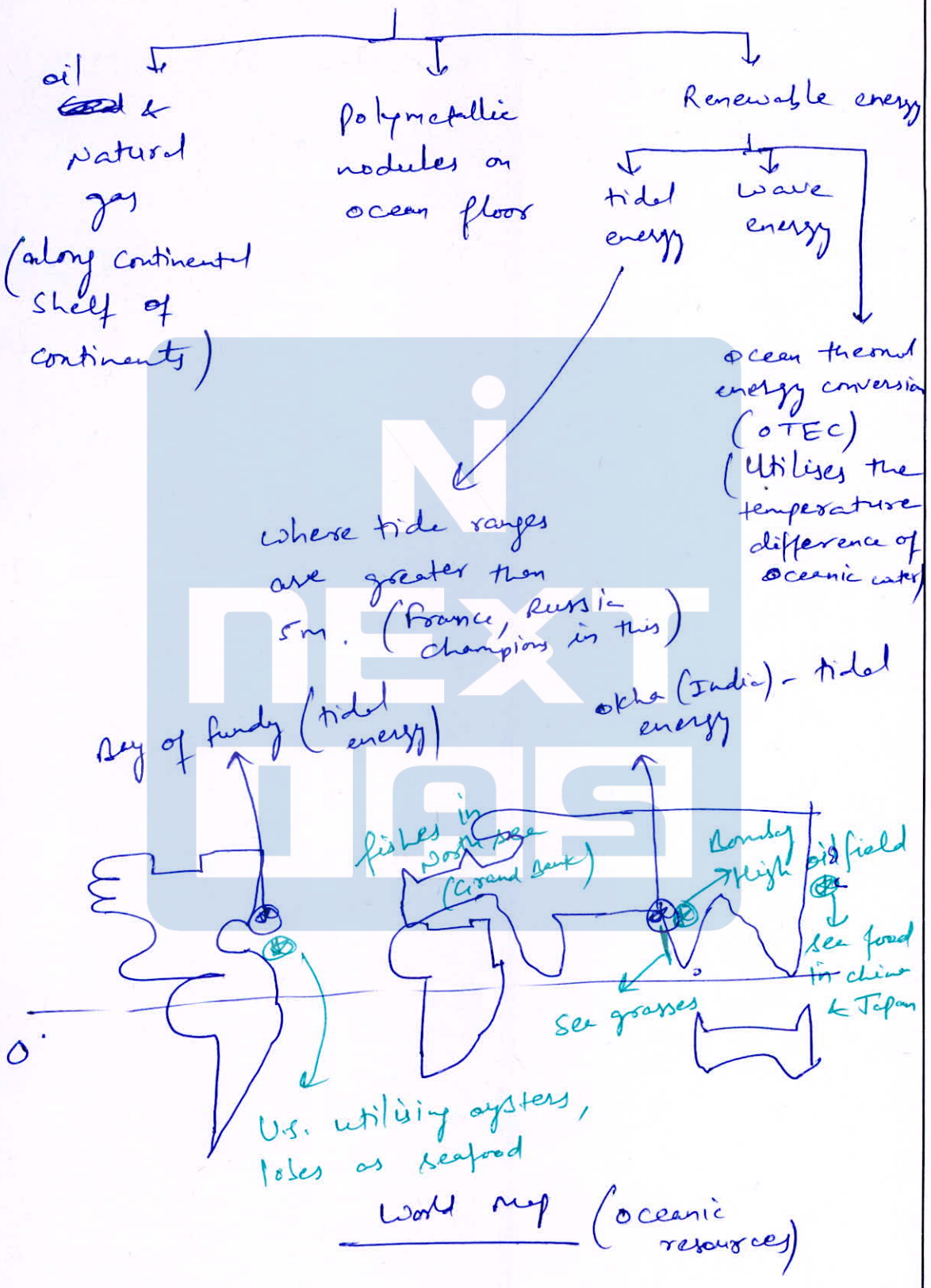
Man & Marine resources —

(i) Sea food — oceans / marine areas provides humans with a lot of seafood in terms of fishes, oysters, lobes, seagrasses etc. which supplements and compliments land food thereby fulfiling food, protein requirements of humans.

(ii) Sea minerals — various minerals are found in sea are, Bromine, magnesium, Iodine, Aluminium, silicon etc. has a lot of significance in industrial development of a country and fulfiling needs like salt for common people.

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(iii) Energy resources —



World map (oceanic resources)

These energy resources are lifeline to many developing countries like China, India, Brazil etc.

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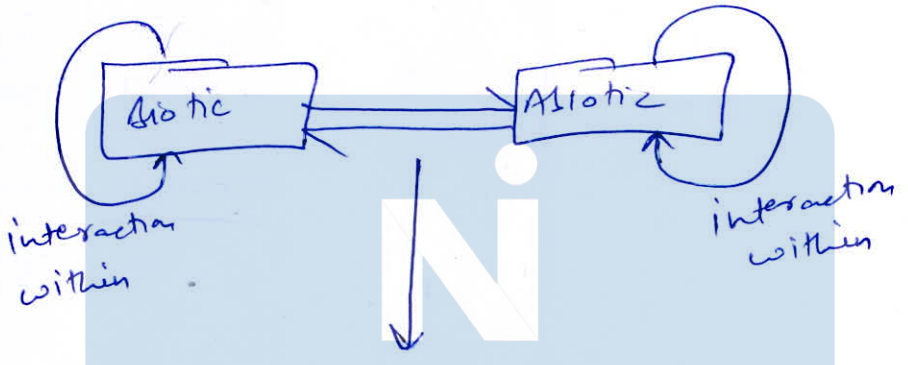
(iv) red clay, oozes etc. are the resources which are found at depth of 5km or so, resulting in providing mineral resources to people.

Ocean are reservoirs of food, energy & many other requirements of humans, so fulfiling SDG 14 of sustainable oceans will help in getting marine resources for human development.

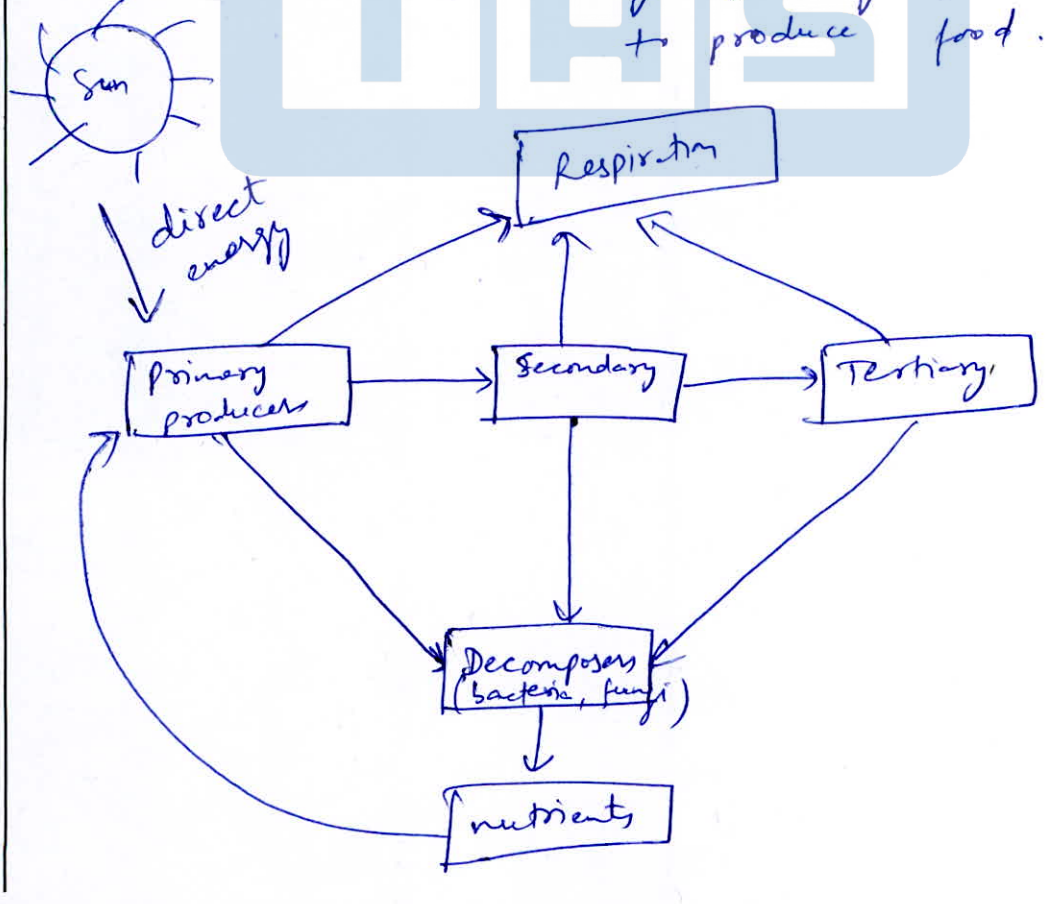
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8. (a) How does the pattern of ecosystems on the landscape reflect a balance between succession and disturbance. Elaborate. **[20 Marks]**

Ecosystem is a self-sustaining, self-regulation process of interaction between biotic & abiotic components of earth.



Ecosystem working concept — energy from sun used by primary producers to produce food.



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Succession & disturbance –

(a) as 10% of energy is passed at successive levels results in maintaing the food & energy chain

(b) disturbance can happen if at any step more energy is consumed by one of the producer than other.

(c) ecosystem is structured in nature, derives its energy from sun will help in succession.

Disturbances in succession i.e. primary succession, secondary succession results in endangering the balance of ecosystem but since it is a self-regulating ecosystem ultimately maintain its balance by keeping this energy & nutrient flow constant and continously going.

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So ecosystem approach on the landscape, its energy transmission of b.f. etc. tend to balance any disturbance & succession in holistic & inclusive manner.

NEXT IAS

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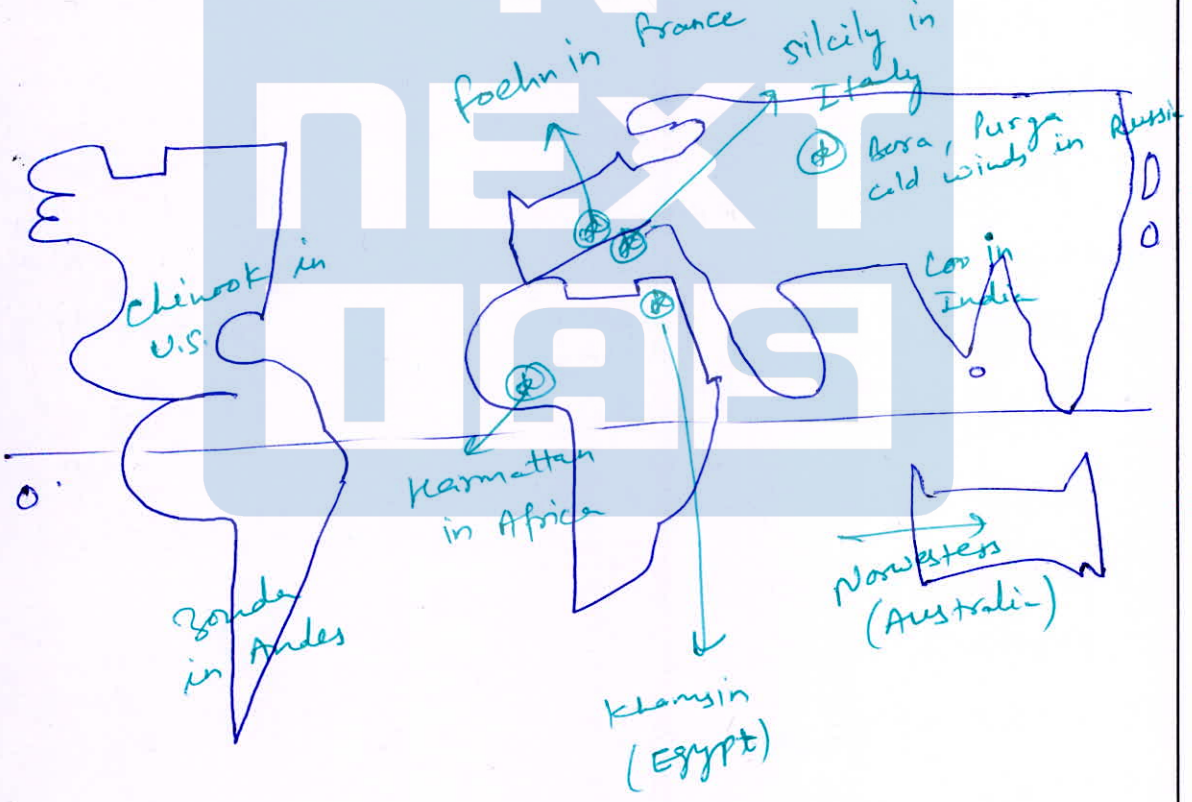


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(b) Discuss the development of local winds, and their influence on local weather, giving three examples of the well – known local winds in the worlds. **[15 Marks]**

Local winds are winds of local region, often forms due to local hydro-meteorological conditions like pressure changes in the region.

Features of local winds – flows locally i.e. in limited regions, develops due to changes in local pressure & temperature etc.



Some more are – Tramontane in Italy, Blizzards in Australia, Chilli in Tunisia etc.

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Their influence on local weather -

(a) Harmattan - flows in Nigeria, often termed as 'the doctor', as it brings respite to people from the scorching humidity in coastal regions by bringing it down. These dry winds often reduces humidity, increases evaporation thereby addresses high water levels in the atmosphere. (originates from Sahara desert)

(b) Chinook - flows from leeward side of Rockies, known as 'Snow-eater' in U.S.A., as these warm winds help in melting snow in U.S. thereby preparing the ground for cultivation and agriculture

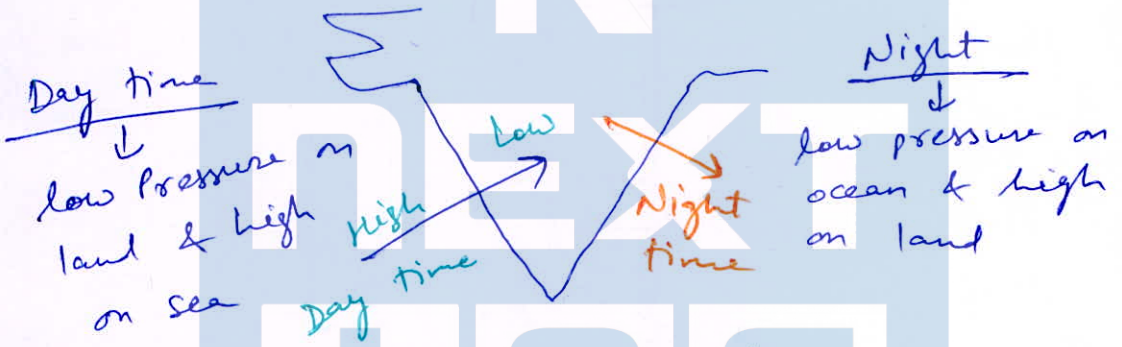
(c) Loo | Kallaishaki - flows in India in the months of April-May, hot dry winds resulting in high temperatures. These winds do occasionally bring thunderstorms & showers by changing

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local meteorological conditions which results in respite from scorching heat of 45-46°C of temperature.

Some permanent local winds –

(i) land breeze & sea breeze – in coastal regions tend to give moderating effect to the climate, at times bring precipitation in the regions.



Peninsular part of India

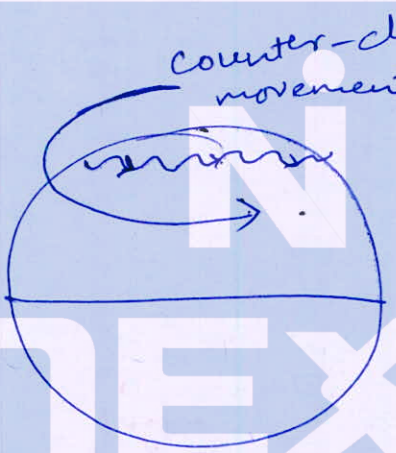
(ii) Ex Mountain & valley breeze is also an example of permanent local wind.

Local winds do bring changes to the weather of areas, particularly where they are flowing, sometimes in positive & sometimes vice-versa.

(c) Discuss the mechanism of polar vortex. How is polar vortex related to the mechanism of climate change. **[15 Marks]**

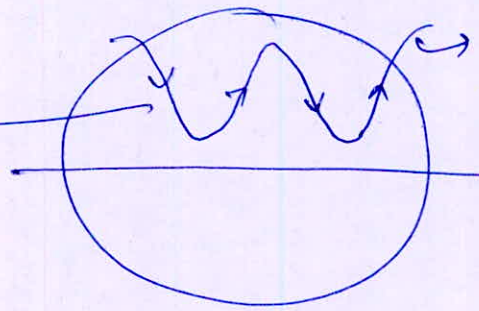
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Polar vortex, a low-pressure region, often associated with thermal contrasts of air temperature, keeps the cold air near the poles in a counter-clockwise manner.



Polar vortex

Offlate, this polar vortex has been oscillating as south as U.S.'s Florida coast, seen by many experts as an indication of climate change weakening the polar vortex.

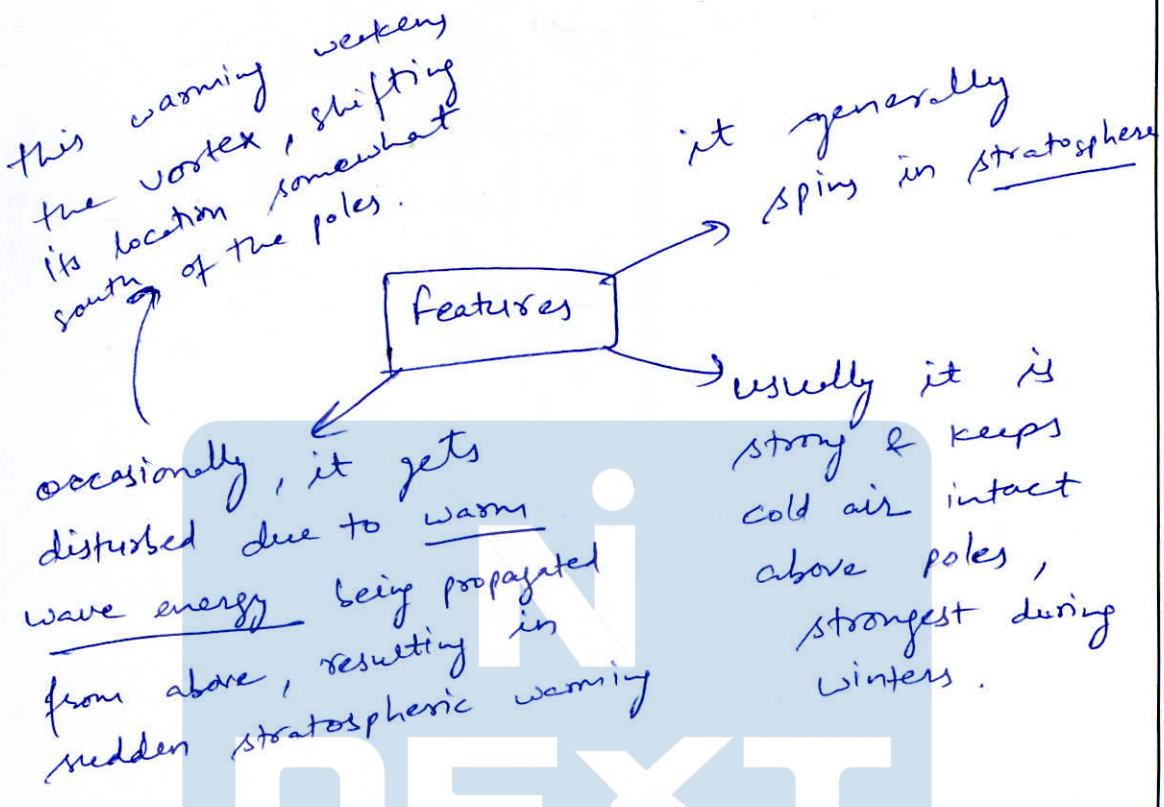


seen as a consequence of climate change.

swirling as down as U.S. coast of Florida, sending cold winds making it difficult for humans to survive

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Features of vortex –



Polar vortex & climate change –

(a) experts said that earth is getting warmed due to increasing climate change & global warm driving its temperatures up, thereby tinkering with earth's heat budget & consequently more heating & more heat propagation tends to weaken polar vortex.

(b) ~~increased~~ decreasing albedo of earth surface resulting due to melting of ices will increase earth's temperature & consequently this

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will affect polar vortex

Climate change is increasing become threat to many hydrological & atmospheric cycles which will disturb the whole ecosystem of earth, polar vortex getting disturbed is a major consequence of it so we need to address this issue to ensure proper processes keeps on going on earth

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

