

GENERAL STUDIES

Name Of Candidate

Harshita Sharma

Roll No.

1910101590

Date:

9 Feb 2023

Time Allowed: One and Half Hours

Maximum Marks: 125

INDEX TABLE

INSTRUCTION

Q. No. Max. Marks Marks Obtained

1

2

3

4

5

6

7

8

9

10

Total: 125

1. Please do furnish Name, Email, Roll No and Mobile in the answer sheet.

2. There are TEN questions printed in ENGLISH & HINDI, all questions are compulsory.

3. The number of marks carried by a question/part is indicated against it.

4. 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.

5. Word limit in questions, if specified, should be adhered to. Any page or portion of the page left blank in the Question-Cum Answer Booklet must be clearly Struck off.

Any specific messages for ForumIAS Mentors/Evaluators with respect to your copy? Write it here.

Evaluator's Discretion:

For Student Only

Start Time | 9 am

End Time | 10:30 am

Total Marks:

Mode Of Examination:

Online Offline

Evaluator's Discretion: This is the marks awarded at the discretion of the evaluator based on your overall impression, on the basis of (but not limited to) your handwriting, presentation, use of diagrams, flowcharts, facts and figures or absolutely anything that he/she liked in your copy.

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ECN CODE:

EG:

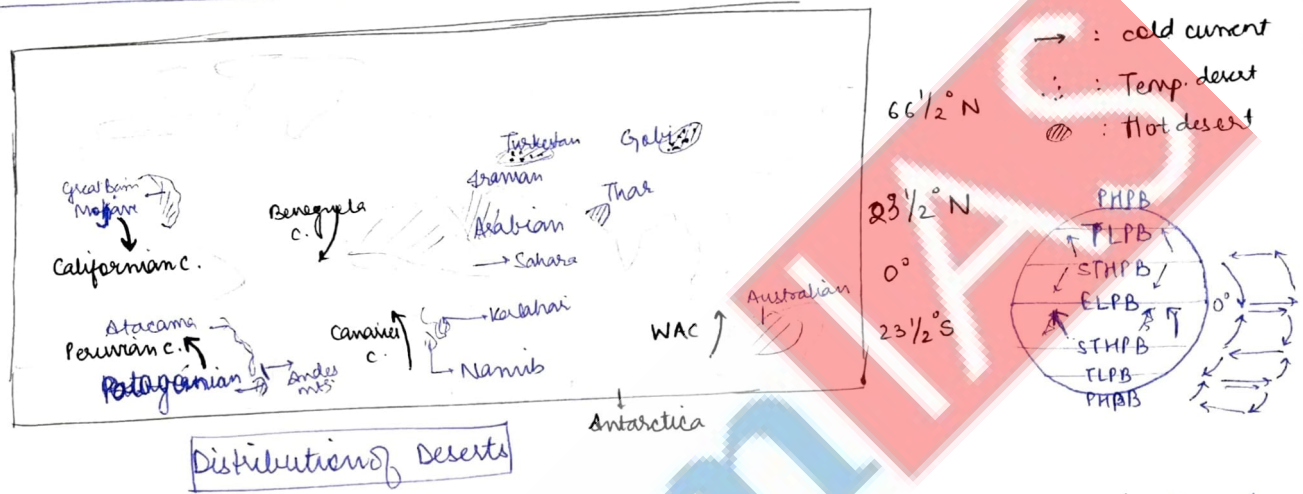
Evaluation Date:

Ans E.

Deserts

- barren land covered with snow/sand/boulders/rocks.
- rainfall < 25 cm (10 inches) in a yr.
- rain deficit, but diff seasons.

Reasons behind Desert Formation



Distribution of Deserts

- ① Sub Tropical High Pressure Belt (Horse latit.) eg. Kalahari, Namib D., etc.
 - Descending air (least favourable to precipitation).
 - Trade winds (rain bearing) blow off-shore
 - Westerlies (rain-bearing) blow off the desert limit
 - winds reaching deserts blow from cooler to warmer regions thereby lowering RH → condensation difficult.
- ② Cold current effect : desiccating effect → winds devoid of moisture ∴ aridity
 eg. Atacama desert due to cold Peruvian Current.
- ③ Continentality (Temperate deserts) : interior location far away from moisture bearing winds
 eg. Tweekstan, Gobi Desert etc.
- ④ Shimment of mt. ranges
 - (i) rainshadow region/leeward side of Patagonian D. on leeward side of Andes mt.
 - (ii) || to moisture laden winds may ↑ aridity eg. Thar Desert.

5. weathering processes

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Adaptations of flora and fauna to survive water-deficit conditions

1. Flora
- succulent plants to store water
 - long deep roots to absorb water
 - small spiny leaves to prevent evaporation (modified) eg. cactus spines
 - shrink in size in dry times to utilize moisture & energy effectively
 - glossy leaves to reflect sun's rays & retain moisture
 - short life cycle. grow - flower - germinate when favourable.
2. Fauna
- nocturnal eg. desert cat
 - burrow during day to avoid harsh conditions and predators eg. desert lizard, African bull frog etc.
 - ability to regulate body temperature eg. thermoregulation in gerbils
 - wide feet for easy movement eg. camel feet
 - store fat in hump eg. camel.
 - absence of sweat glands, specialized kidneys to conserve H_2O levels eg. kangaroo rats

Increased anthropogenic intervention has aggravated process of desertification of even fertile lands.

UNCCD shall be implemented in letter & spirit to combat the perils that desertification may lead to

Ans 7.

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the large scale movement of air around the planet. In conjunction with ocean circulation, it plays a crucial role in redistribution of thermal energy on Earth. The tri-cellular model is one such model to explain surface wind distribution & atmospheric circulation

TRI-CELLULAR MODEL

- ↗ : direction of winds
- ↘ : convergence
- ↖ : divergence

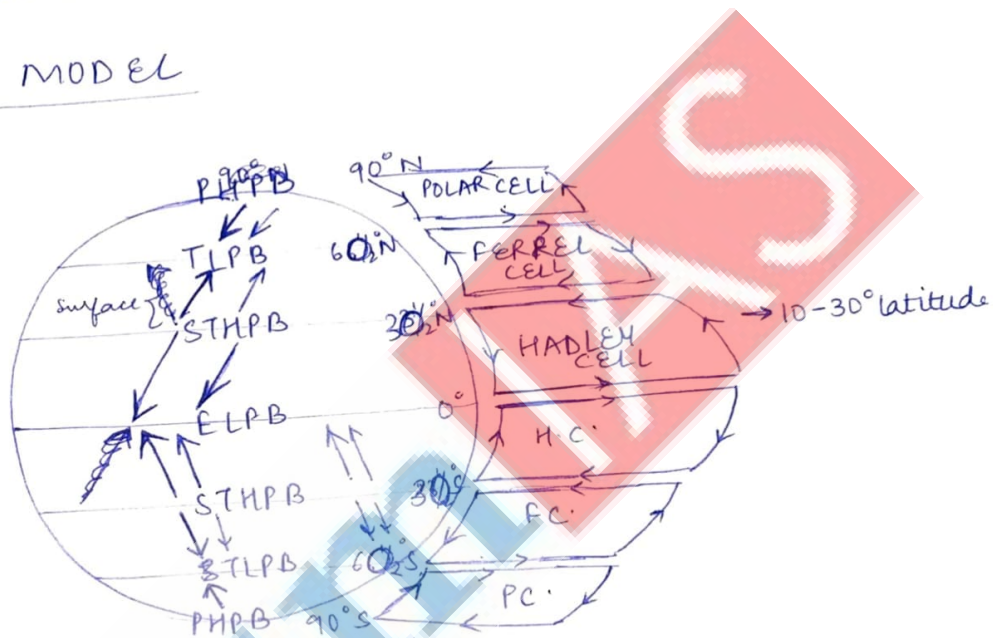


Fig.

Hadley Tropical cell

10-30° N/S

Thermally induced due to intense solar radiation

LP @ ITCZ

Trade winds

Ferrel mid-latitude cell

35-60° N/S

Thermally indirect driven by dynamic eddying

air flows poleward & eastward near surface

equatorward & westward @ higher altitude (Westerlies)

Polar cell

65-90° N/S

Thermally direct; peak: winter

Easterly winds

Significance in explaining world climatic patterns.

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- explains location of deserts - Kalahari, Namib etc.
anti-cyclonic aridity, atmosph. stability.
2. Heat Budget - global Heat Imbalance.
 3. Precipitation & monsoon eg. Indian
 4. upper air dynamics eg. jet streams due to rotating earth influenced by this model.
Shift of pressure belts
 5. Geophysical Phenomena - cyclones, western disturbances etc.

Limitations

- (i) doesn't consider irregularity of Earth's topography
- (ii) fails to explain upper air circulation
eg. Ferrel cell implies easterlies in upper atmosphere where westerlies dominate.

Hence, the tri-cellular model though not 100% accurate, yet is very helpful in analysing atmospheric phenomena.

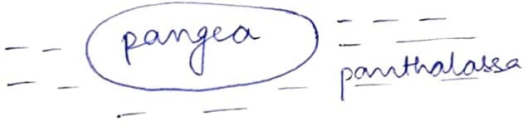
us 8. CDT and Plate Tectonic Theory are models that have tried to answer questions related to evolution of geographical features on earth like continents, oceans, etc.

Drift Theory

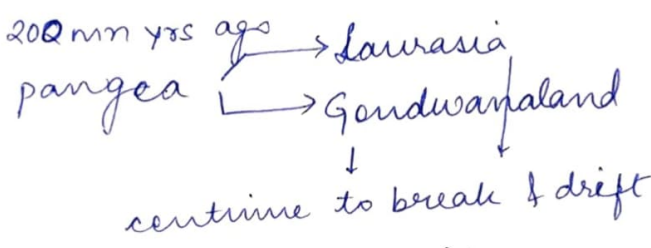
Alfred Wegener

①

②



③



↳ Evidence: Jig-saw fit

• match of S. America & Africa
Eastern Brazil Western Africa

↳ force behind → pole-fleeing force
↳ Tidal currents

↳ some lacunae.

Plate Tectonic Theory

McKenzie, Parker, Morgan, etc.

Lithosphere broken into distinct plates floating on a ductile layer called asthenosphere (upper mantle)

- oceanic plates
 simatic → thin & dense
- continental plates
 sialtic → thicker & less dense

↳ continuous movement of plates due to conventional currents within magma.

also explained volcanism, island formation etc.

Plate Tectonic Theory

a. explain orogenesis

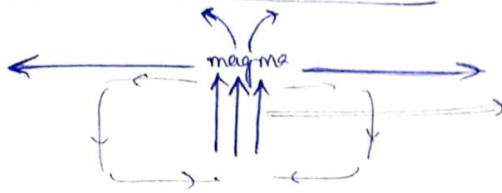
1. mountains @ convergent plate boundaries

2. in case of convergence between oceanic & continental plate boundaries, oceanic subsides beneath due to higher density (eg. Andes.) pushing continental plate upwards.

3. continent-continent convergence: lighter uplifts, heavier (denser) subsides) eg. young fold mts Himalayas formed due to subduction of Indian plate beneath Eurasian plate.

b. explains volcanism

①



divergent boundaries

upward limb of convectional current

eg. mid oceanic ridge in middle of Atlantic.

②

convergent → oceanic beneath continental → oceanic disintegrates due to Temperature

volcanism ← leads to melting basalt ↓ tries to find way to surface

eg. Pacific Ring of Fire (submergence zone)

Thus, Plate Tectonics is one of the most wholesome theories accepted to determine evolution of landforms.

Ans 9.

Ocean current is a continuous definite movement of oceanic water in a definite path & direction. It can be influenced by wind, gravity, Coriolis force, etc. They have a seminal impact on human activities in the regions.

Forces that affect Ocean currents

A. Primary

(i) insolation (initiate)

(i) Insolation

(ii) gravity
pulls down → piling gradient

(iii) wind
driving force
friction between air & water

(iv) Coriolis force
deviation
NH → right
SH → left

Δ → expand → flow gradient

eg. near equator : 8cm higher than middle level

Salinity and Temperature $\xrightarrow{\text{cause}}$ Density variation

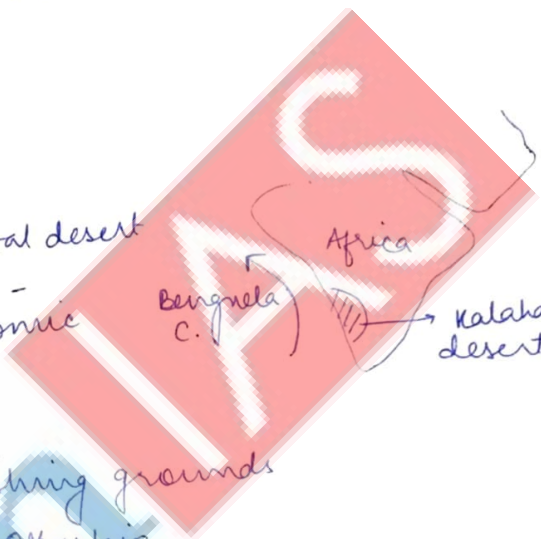
• saline & cold \rightarrow sink

• hot \rightarrow rise

eg. cold water at pole sink & moves towards equator
and hot water at equator moves towards poles to
replace cold water.

IMPACT ON HUMAN ACTIVITIES

① cold-water currents \rightarrow coastal desert
 \rightarrow socio-economic lives



② meeting of cold & warm water currents \rightarrow fishing grounds

eg. Japan \rightarrow Kuroshio & Oyashio
Newfoundland \rightarrow America

③ warm currents \rightarrow marine & coastal tourism
eg. Mediterranean region, Britain

④ \rightarrow keep ports ice free (shipping)
in higher latitudes
eg. NAD on W. European countries

⑤ Climatic influence

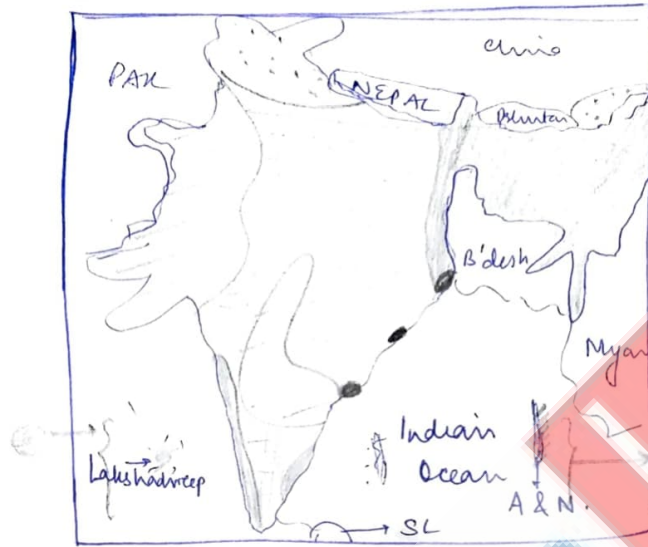
(a) W. coast of continents
in T & ST latitudes
prevalence of cold
water currents
 \rightarrow arid areas
 \rightarrow ppl adapt

(b) W. coast of continents
in middle & high lat.
 \downarrow
warmth
 \downarrow
• reduced heat bills
in winter

(c) Transposition
of Δ
• cold water
(poles to tropics)
• warm water
(tropics to poles)

Ocean currents are thus very crucial in impacting climate
human activities across world in a profound manner.

India State of Forest Report, 2021 specifies that 21.71% of country's total geographic area is covered with forests



- Littoral & Swamp F.
- Tropical evergreen & Semi-evergreen
- Montane
- Tropical Thorn
- Tropical Deciduous

Type

Features

Distribution

① Tropical Evergreen & Semi-evergreen forests

- ① well stratified layers creepers, shrubs, short trees, tall trees
- ② green year-round
- ③ eg. ebony, mahogany, rosewood.

- ① warm & humid areas
ppt > 200 cm
mean annual temp > 22°C
eg. A & N islands

② Tropical Deciduous Forests

- ① most widespread in India
- ② 'monsoon forests' (also called)
- ③ teak, sal, shisham, mahua, amla, amalaki, sandalwood
- ④ shed leaves in dry season

- ① sf ~ 100-200cm
- ② along NE states, Himalayan foothills, Eastern slopes of western ghats

③ Tropical Thorn forests

- ① scrubs vegetation shrubs, grasses of ~2m tall & tussocky grass
- ② babool, ber, neem etc

* Dry deciduous forests (70-100cm)
eg. plains of UP & Bihar

- ① < 50 cm sf

forests

⑤ Littoral and swamp forests

② succession of vegetation
eg. tropical to tundra in Himalayas, temperate to subtropical in W.Ghats.

- ① wetlands, mangroves features → salt marshes, tidal creeks, estuaries
- ② salt tolerant species eg. Sunderi tree (Sunderban)
- ③ shelter to wide variety of birds

- ① Himalayas
- ② western ghats
- ③ Nilgiris ④ Andhra

① Islands & coastal areas eg. Bhitarakanika NP

Major causes of deforestation

- ① agricultural economy & food security needs eg. v. low forest cover in Punjab & Haryana
- ② Infrastructure in ecologically fragile & sensitive zones eg. HEPP in Himalayas
- ③ Cater to consumption needs of large population eg. paper, wood etc.
- ④ mining eg. sand mining, quarrying
- ⑤ urbanization

① Sustainable forest management

eg. Kasturibangan committee recommendations to separate cultural areas from natural landscape in W. Ghats

② Integrated farming — social forestry, farm forestry to ↓ pressure on resources

③ Regenerative agriculture

④ green cities — balanced urbanisation with afforestation, green finance

⑤ green & circular economy eg. Life.

⑥ coordinated planning — eg PM-GATI SHAKTI to minimize ecological footprint & ↑ synergy between different modes of connectivity

⑦ Bottom-up approach — mobilise G sam Sabha, schools, RWA, harmony & not harm principle.

forests are the bullwarks of economy and
sina - qua - non for the very existence of
human. It is an important priority to
save the lifelines of humankind.

Ans. 5.

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Indian coastline stretches for more than 7500 kms. The western coastal lowlands face the Arabian Sea while the eastern coast faces the Bay of Bengal & lies parallel to it.

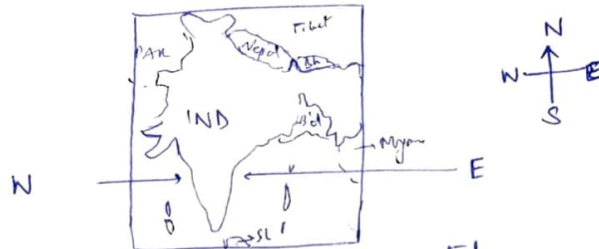


Fig: Indian coastal

Western coastline

- ① submerged
- ② narrow (30-50 km)
- ③ steep continental shelf & narrow (~60 km) (near Kerala).
- ④ rivers flowing along western coast do not form delta. fewer rivers drain.
- ⑤ steep slope → depositional landforms
- ⑥ Kayals in Kerala, mangrove area less than East coast
- ⑦ less affected by cyclones, even if does → lower intensity

Eastern coastline

- emergent coast
- wider (130 km)
eg. Cauvery Delta
- gradual & wide continental shelf
eg. ~500 km into the sea
- well developed delta by Hooghly, Godavari, Krishna.
- gentler/smooth slope → erosional landforms
- Lagoons eg. Chilika lake
Mangroves eg. Sunderbans
- ⑧ severely affected due to depression in BOB -

These differences lead to differences in human geography :
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	<u>Western</u>	<u>Eastern</u>
<u>Economical</u>	more imp. eg. Mumbai (defacto financial capital) Ahmedabad	lesser
<u>Agricultural</u>	lesser	more imp. → fertile ← deltas irrigation
<u>Historic</u>	lesser	more imp. eg. Trade with SE Asia
<u>Transport</u>	deep ports due to natural harbours	lesser
<u>Population</u>	lesser	more densely populated

The richness of diverse geographical features along the East and West coast provides rich cultural, social and economic possibilities. Conservation & sustainable use should guide the relation between physical & human geography across the entire spectrum.

Antarctic region constitutes the southern - most continent of the world. As per Antarctic Treaty (1961) the region is de-militarised.

Reasons for renewed human interest

- Environmental concerns
 - O₃ layer
 - planet resilience
 - permafrost
- Ground for nuclear weapons tests / explosions (strategic importance)
- looming water crisis → ground for fresh, unadulterated water
- rich mineral resources, fisheries → vulnerable to illegal activities like mining
- scientific research → dark sky reserves
→ origin of universe
- tourism potential eg. Bear Grylls (Man v/s Wild, NatGeo)

ANTARCTIC BILL, 2022

Provisions of the bill apply to: any

- person
- vessel
- aircraft

 part of Indian

authority to manage: Indian Antarctic Authority
expedition to Antarctica

Protection of India's interests:

- Antarctic Tourism, fisheries
- Committee on Antarctic governance & environmental protection in compliance with intl. laws.
- Prohibited activities
 - nuclear explosion / disposal of radioactive wastes
 - plastic, garbage discharge
 - introduction of non-sterile soil.

4. Regulation & framework

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permit /
authorisation
required

- excavate mineral resources
- vessel to enter / remain in Antarctica
- waste disposal

5. Before a permit is granted, need of

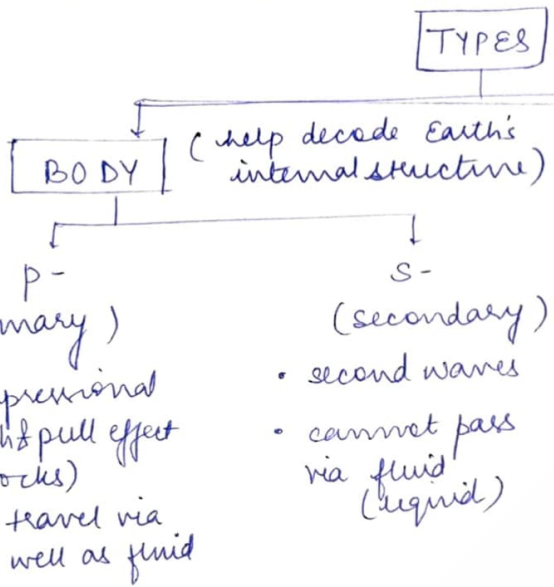
- EIA
- Waste management plan

6. Penalties

- ① nuclear explosion ⇒ imprisonment upto 20 yrs which may extend to (life + fine = ₹ 50 crore)
- ② introduction of non-native species or drilling minerals ⇒ imprisonment upto 7 yrs
- ③ central govt may notify one or more Sessions court as designated court under this act.

The antarctic region offers wide avenue to research & environmental protection but must be approached in a sustainable way. The antarctic Bill is a step in the right direction.

Ques 3 - Seismic waves are the waves of energy generated due to sudden movement of material within earth eg. earthquake, volcanism, avalanches etc. They are measured in intensity via seismographs (.recorded) esp. during earthquakes.

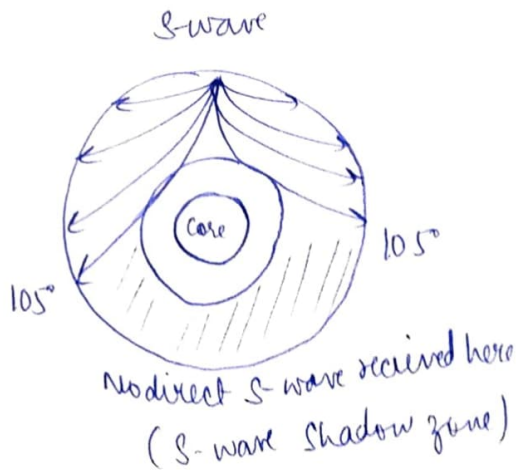
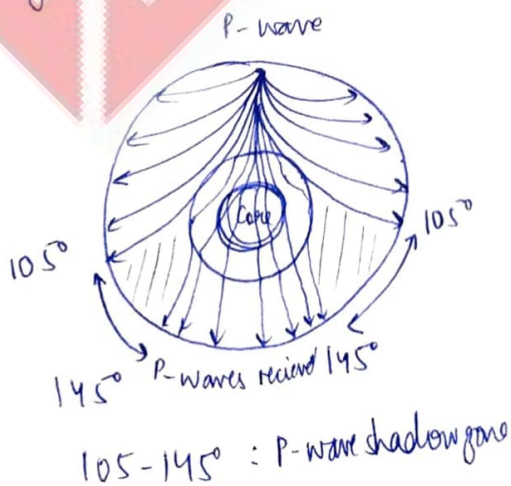


SURFACE (not v. useful to decode it)

- affect only surface, as die at smaller depth
- carry energy longitudinally in direction, thus cause lot of damage

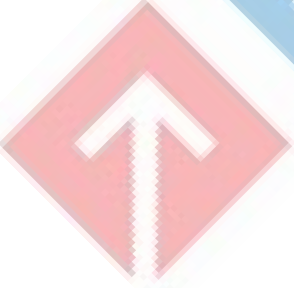
Relevance of Body waves

- ① Estimate of thickness of various layers of the Earth by arrival times
 - p-waves are faster, travel via both S and L;
 - s-waves slower, cannot travel via L.
- ② Composition by shadow zone of seismic waves on seismogram
i.e. presence/absence of P- & s-waves due to blocking & deflection by structural layers



③ Structural ~~concept~~ changes in velocity & deflections correspond to uniformity and discontinuity in states of matter.

Various indirect methods like gravity, \vec{B} , etc. are used by geologists to decipher earth's internal structure of which seismic ones form a crucial component

 **FORUM IAS**

Qnt: 2.

Himalayas → set of young fold mountains
 → border between India & Tibet (≈ 2400 km)
 → avg. elevation ~ 6000 m ; "highest mountain ranges in the world".

Role in determining climatic conditions is seminal



- ① Climatic Divide → between India & ~~Asia~~ C. Asia → moderating effect
 → prevents cold winds from C. Asia
- ② Monsoon Climate
 - ① confine & trap monsoon winds → force them to shed moisture within Indian subcontinent
 - ② split STWTS in two bands - one of which is STJS establishing over southern slope of Himalayas & plays a role in break of Indian monsoon.
- ③ Himalayas & Tibetan plateau → Northward shift of southern branch → onset of monsoon in India
 - origin of TEJS
 - reinforces monsoon winds near Mascarene basin
 - intensifies monsoon
- ④ channelise W. disturbances from W. Asia → cause rainfall
 (i.e. bifurcating jet streams)
- ⑤ Himalayas → high altitude → cold alpine climate → snowfall despite India being in tropical & sub-tropical latitudes as 'Altitude mimics latitude'

5. Rivers originating from Himalayas like Ganga, Yamuna, Brahmaputra, influence micro climate in respective basins. eg. humidity, moderating impact etc.

6. Himalayas are a part of Hindu-Kush Himalaya region which houses max. no. of glaciers outside poles thus called Third Pole of the world. They provide temperature moderation, GW mitigation, etc.

Hold immense significance not only for India but world climate. Currently under threat due to :-

- ① Anthropogenic Global Warming : As per IPCC reports, with current level of Temp rise, Him. rivers will vanish by 2050 due to glacier melt.
- ② Climate Change impacting it as it is one of the most sensitive biodiversity hotspot in the world.
- ③ Factors like
 - overexploitation of resources
 - encroachments
 - unsustainable (development & tourism),
 - forest fires, natural calamities

The pristine glory of the ecologically fragile region, considered as natural guards of the world needs to be ~~conserved~~ preserved through collaborative steps.

Projects like SECURE Himalayas are a step in the right direction

Tropical cyclones are violent storms with:

- origin: over oceans & move to coastal areas
- Impact: large scale destruction
 - squalls (violent winds)
 - storm surge
 - Terrestrial rain
- Other names: Willy Willy (Australia), Hurricanes, Typhoons etc.

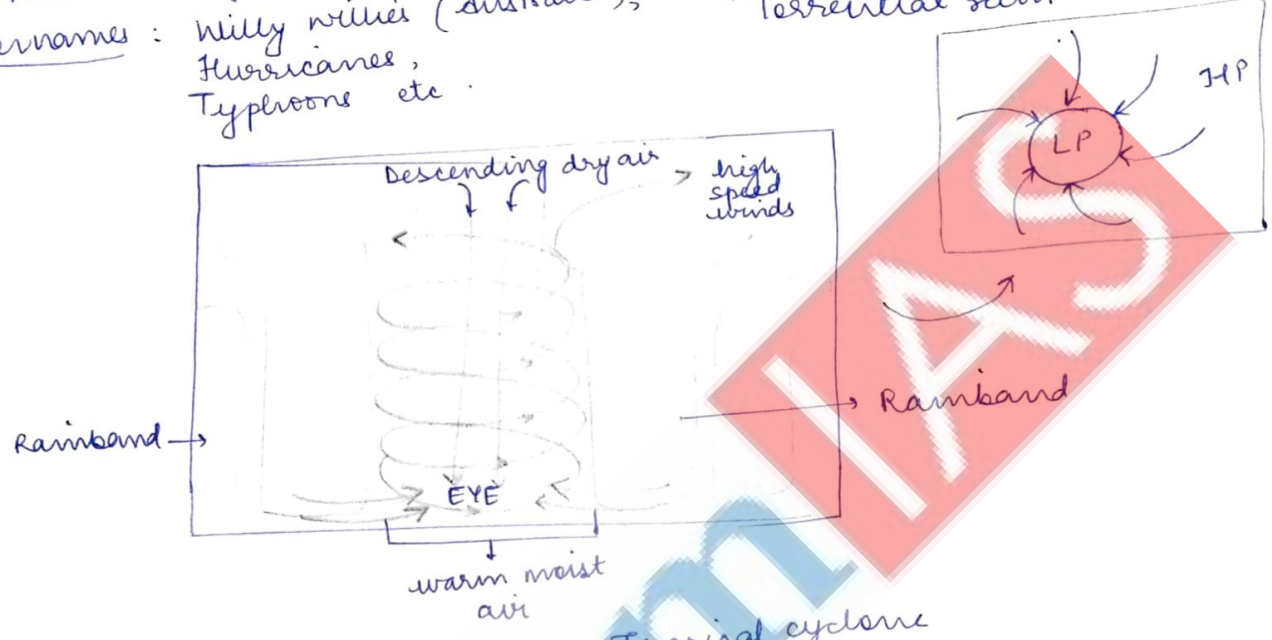


Fig. structure of Tropical cyclone

Suitable conditions for formation of a Tropical cyclone

- ① pre-existing weak LP area
- ② Sea surface Temp (> 27°C)
- ③ converging winds near ocean surface, forcing air to rise & form storm clouds.
- ④ Low wind shear: winds should not vary greatly with ht; so as to allow storm clouds to rise higher.
- ⑤ presence of coriolis force to provide vorticity
eg. It is absent near equator & so are tropical cyclones (not formed at equator)

Tropical cyclone

Extra-tropical / Temperate

Frontal system	① not well developed	① well developed
driving force	① Coriolis F.	① Frontogenesis
origin	① over sea ; die on landfall & cause huge destruction ; cover lesser area	① can be over land/sea ; cover large area
Latitude & direction	① 5-30° N/S of equator ② moves E → W	① 30-60° N/S ② moves W → E
affect	① both coasts of ^{India} but East coast is a hotspot	① rain to NW India "Western disturbances" (associated instability is called so)
wind velocity	① higher ; more destruction winds (squalls) torrential rain storm surge	① comparatively lower ; lesser destruction
	elliptical in shape ; axis to isobars follow parabolic path	

Tropical cyclones are a way to maintain global heat balance, transporting warm tropical air from near equator to higher latitudes. However, effective mitigative steps like disaster resilient infrastructure need to be developed against their ill-effects. They also efficiently produce rain & act as drought-reliever.

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Parameters	Excellent	Very Good	Good	Average	Poor	Very Poor
Language						
Structure						
Presentation						
Handwriting						
Content						
Attempt						

ADDITIONAL REMARKS

