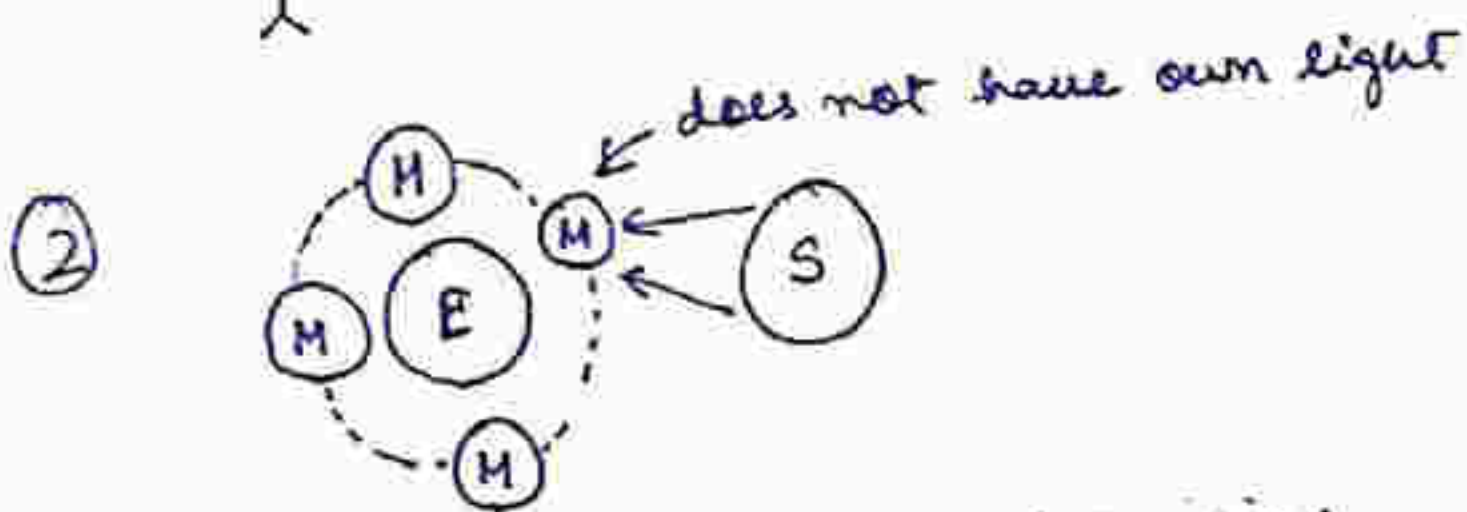
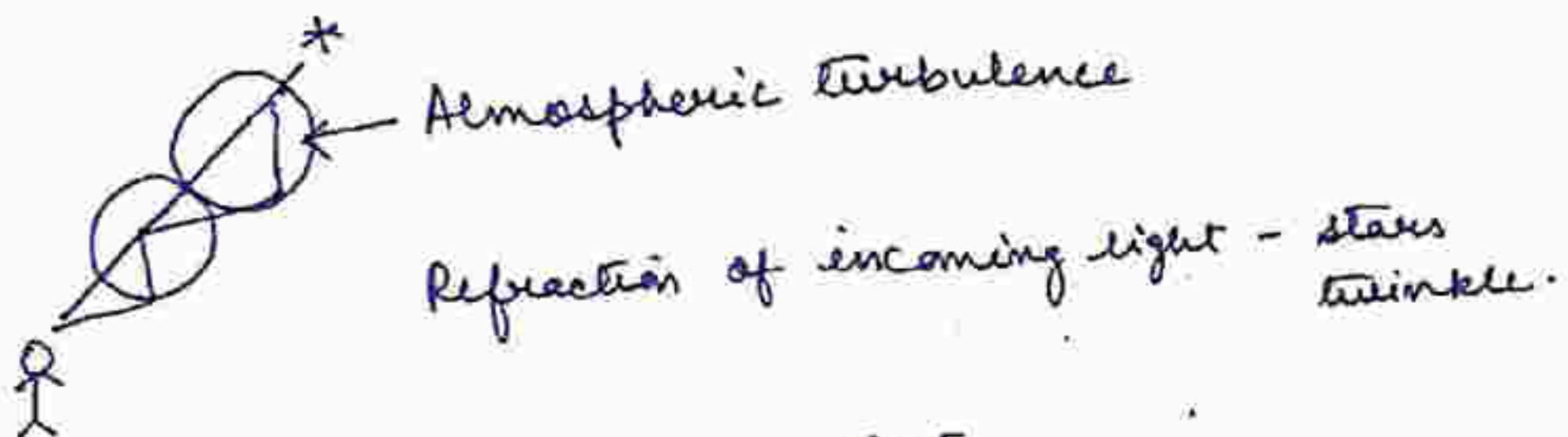


## The Earth in the solar system - Ch ①

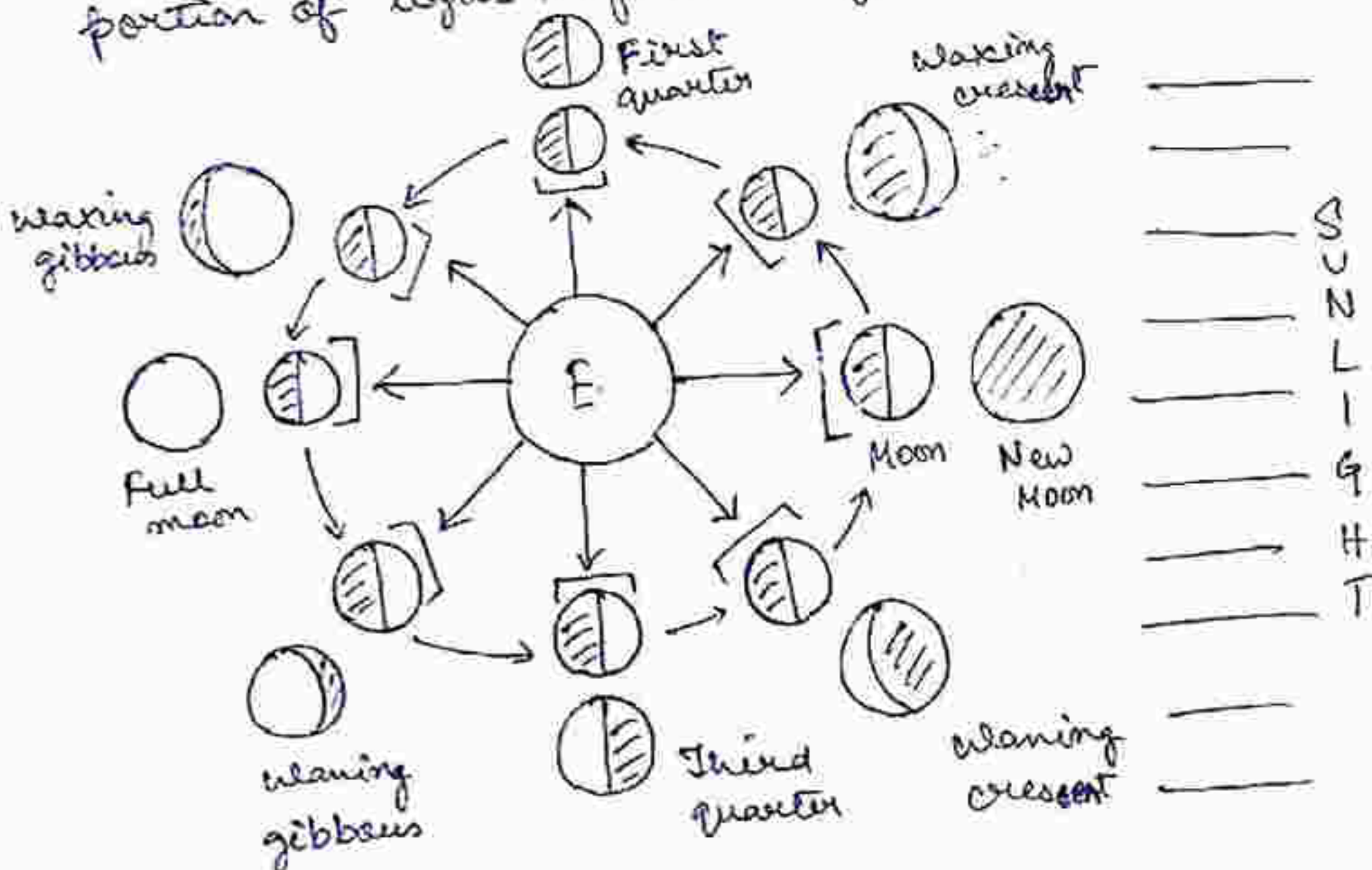
① Stars can twinkle because of many factors.

- distance
- temperature of the star
- size of the star
- However, the atmospheric refraction of light is considered as one of the important reasons for twinkling of stars



Changing position of moon:

Amount of light reflected by the moon varies due to different shapes of the moon, different portion of light reflected by the moon.

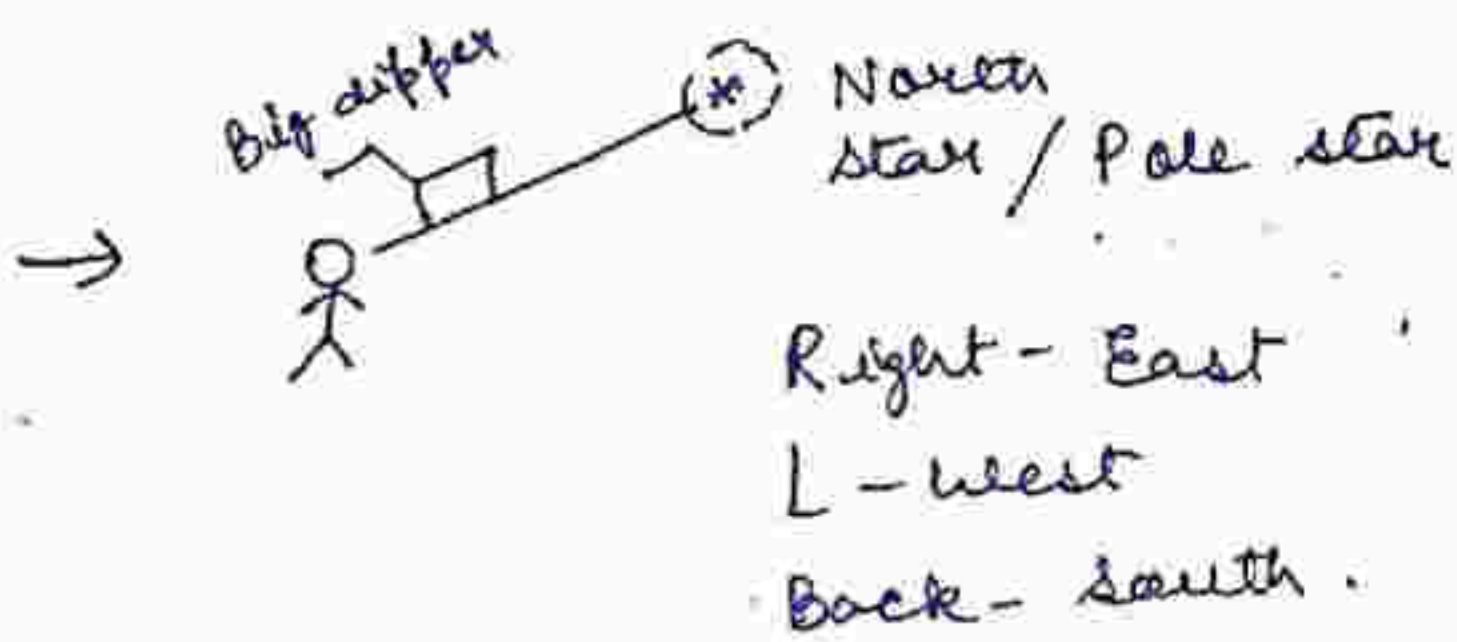
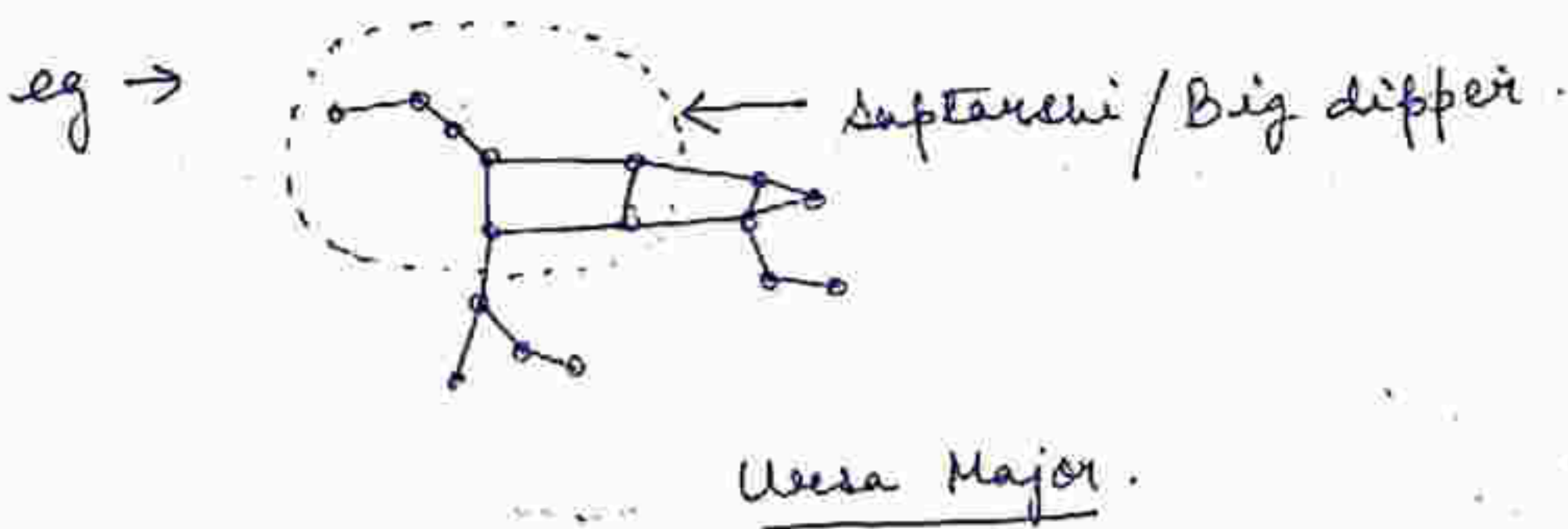
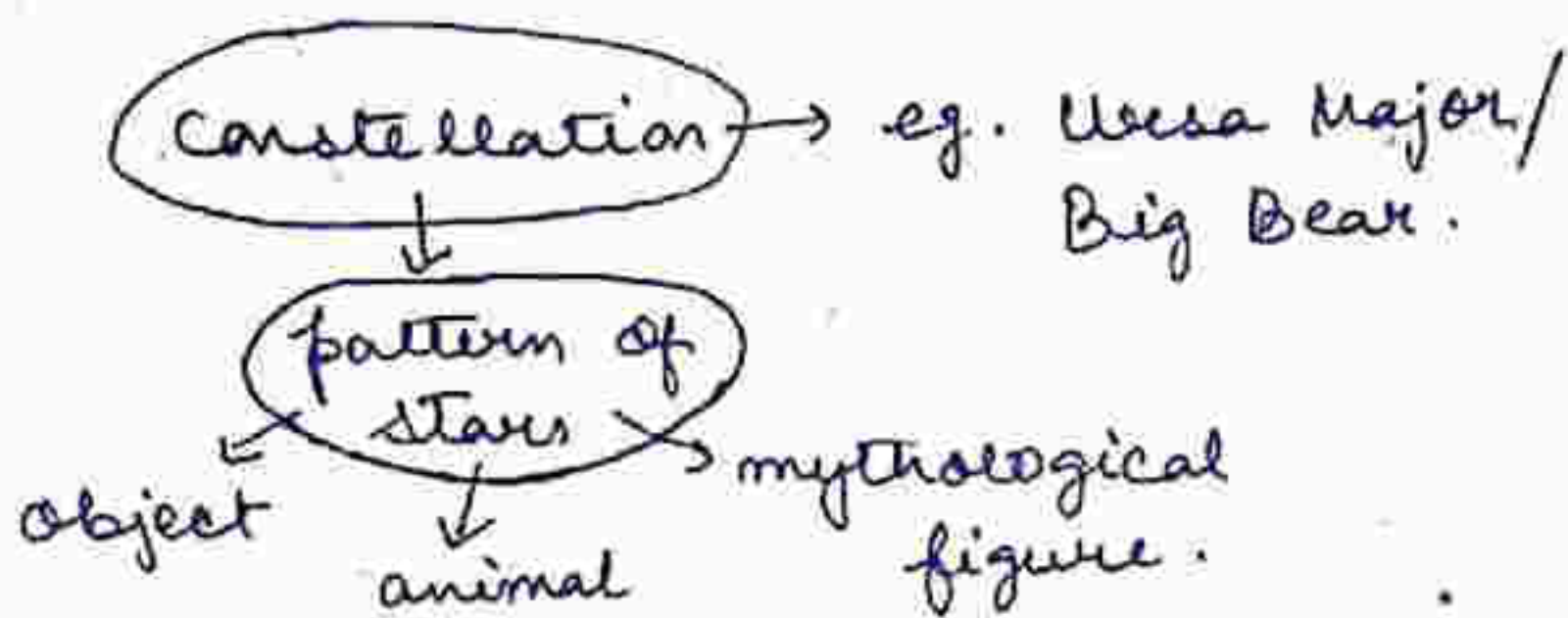




→ Waxing - light is increasing  
 waning - decreasing.

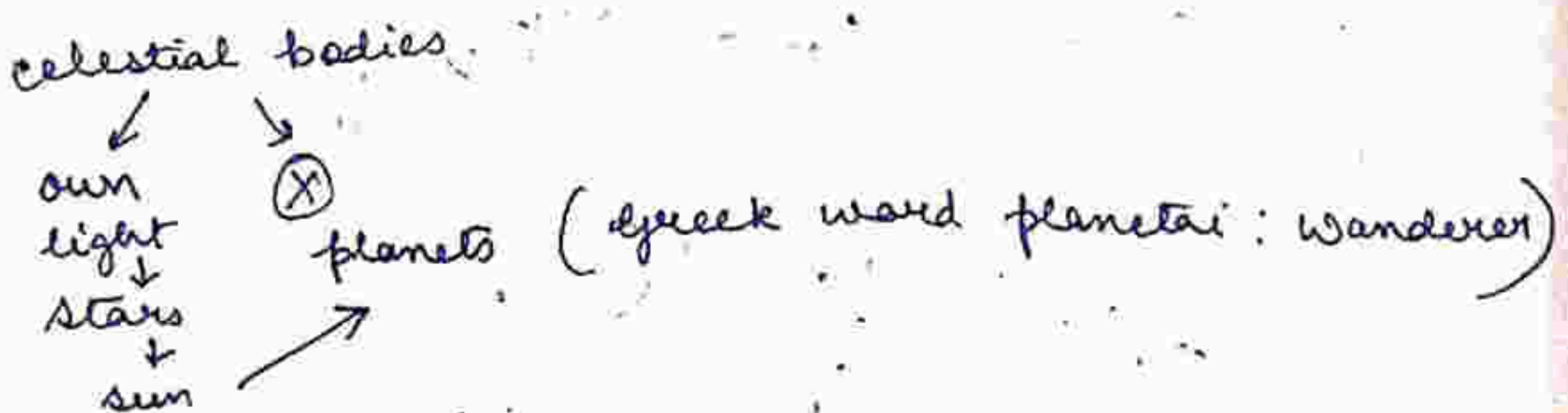
→ Celestial bodies: sun, moon, planets, stars

→ Constellation of stars:

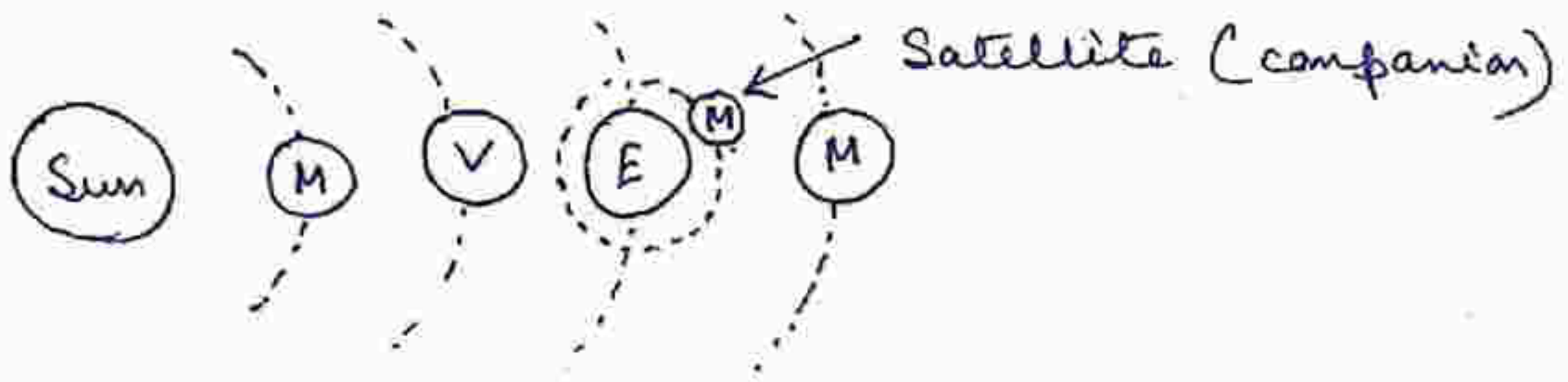


In ancient times, people used to determine directions during night with the help of stars.

→ Planets and satellites







→ Planets have 1/more than 1 satellites.

→ sun → Hot gases, H, He

↓  
Nuclear Fusion

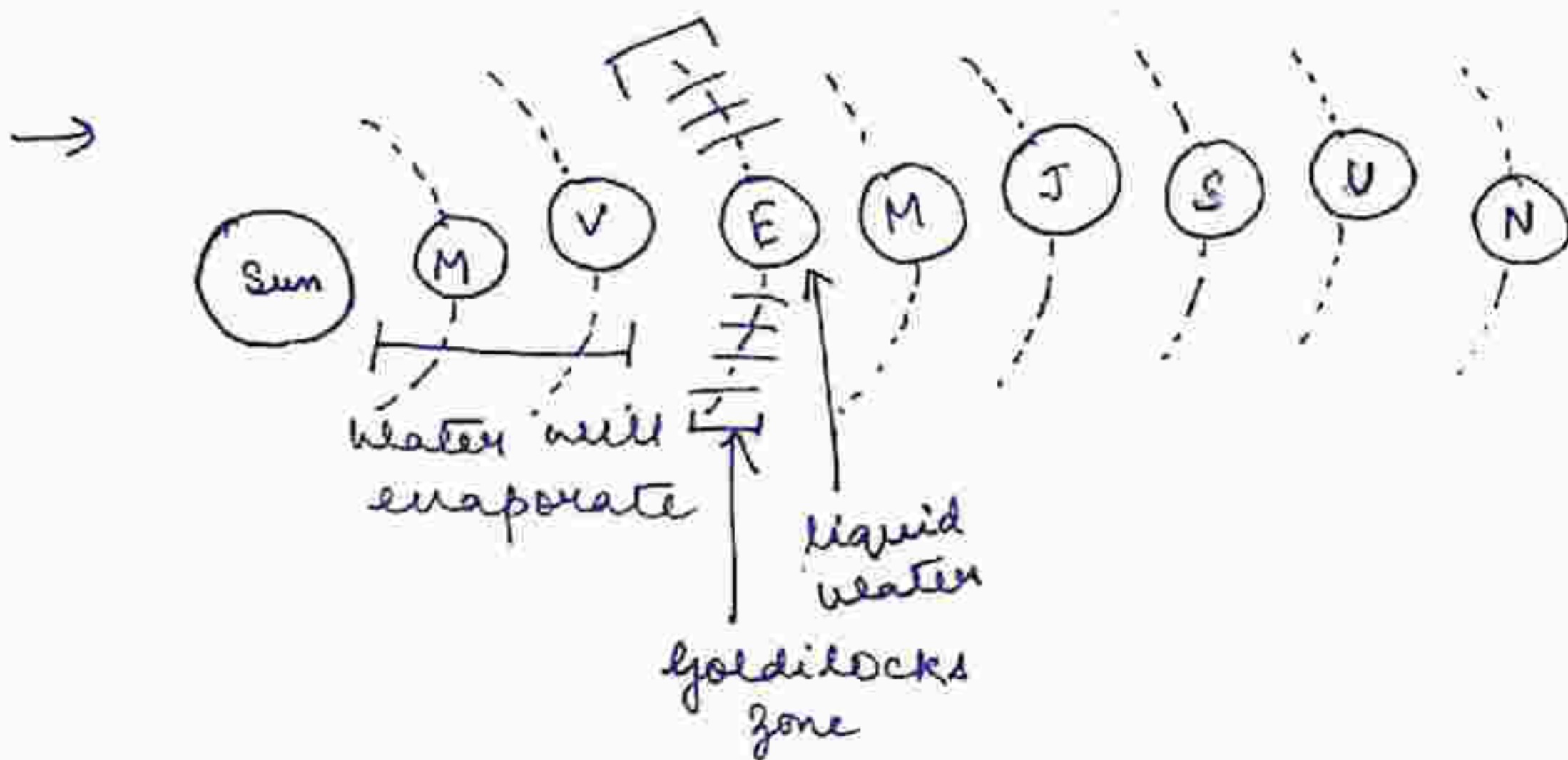
↓  
solar energy

↓ ↓ ↓  
other planets getting energy

→ Pluto → Dwarf Planet

→ too rudimentary to consider as planet

Other dwarf planet exs: Ceres, 2003 UB313



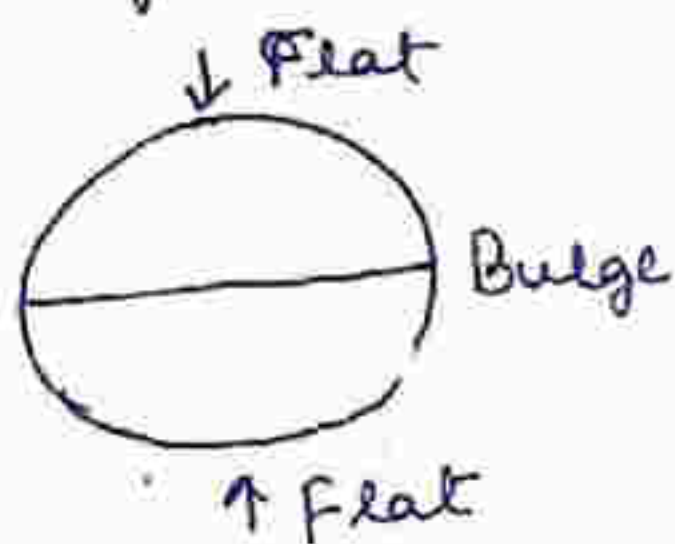
Goldilocks zone: It refers to a habitable zone around a star, where it is not too hot and not too cold for liquid water to exist on the surface of the surrounding planets. Liquid water is essential for life. Our earth is in the sun's goldilocks zone.



① → 'Goldilocks zone' is often seen in news in the context of:

- the limits of habitable zone above the surface of the earth
- Regions inside the earth where gas is available
- search for earth-like planets in outer space.
- search for meteorites containing precious metals.

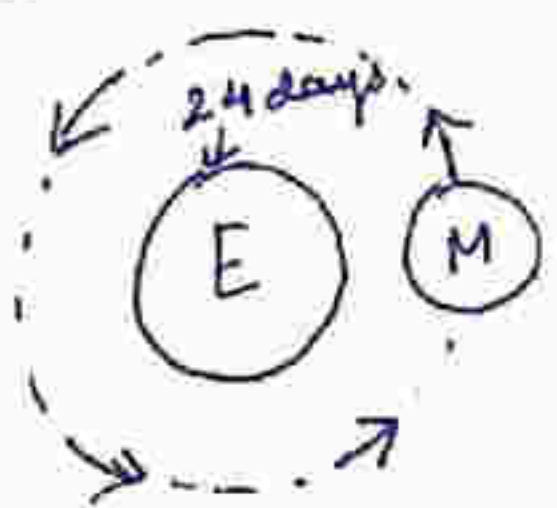
→ Shape of earth - geoid, oblate spheroid.



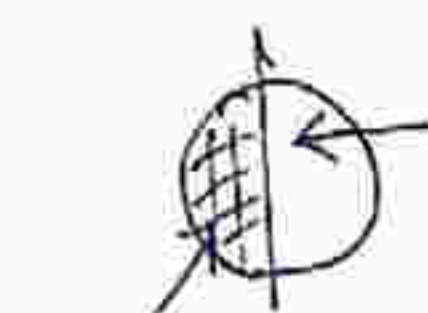
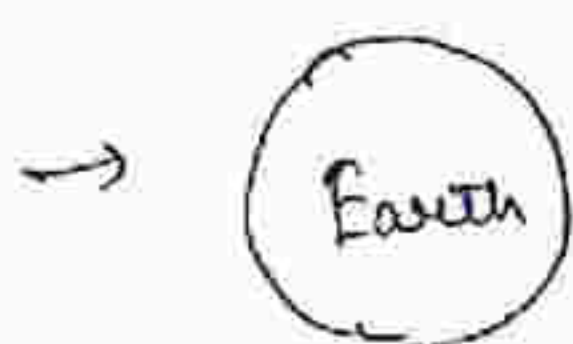
→ Twin brother of Earth - Venus - (shape/size similar)

→ earth - unique planet  
- 2/3 rd water → 66%

→ Moon → natural satellite



period same  
Rotation/Revolution → 28 days  
→ so one side of the moon is visible.  
→ Moon is tidally locked with earth.

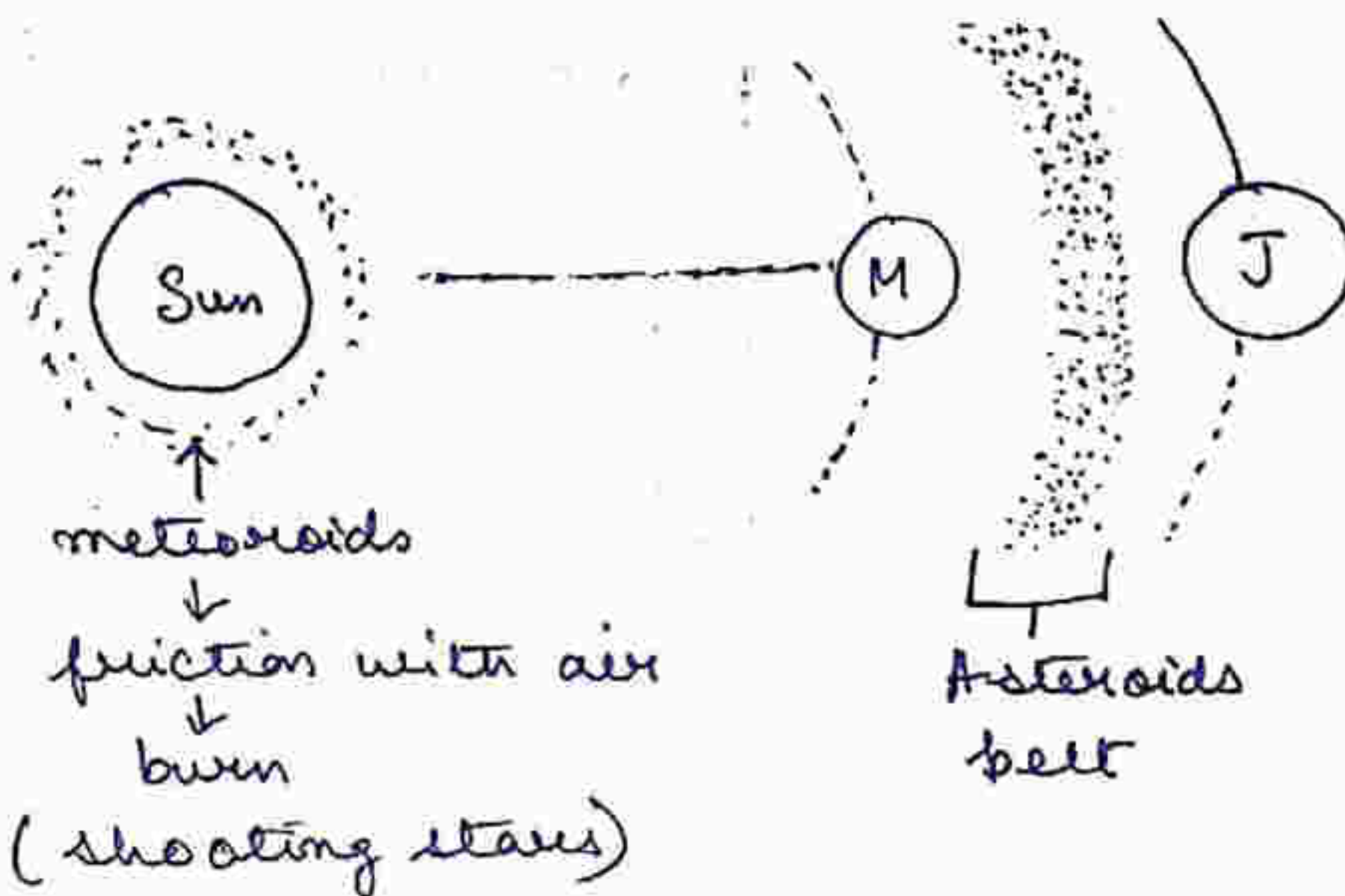


near side of the moon (always visible)

Face side. • Difficult to land ← Rover will send image



### Asteroids - Meteoroids



→ Certain meteoroids don't burn completely → impact land on earth's surface. eg Lonar Lake, MH (meteorites)

→ Asteroid → large particles  
 If asteroids also enter our atmosphere and burn then it can also be → may be fragments of solar system formation process  
 → Mars - Jupiter belt

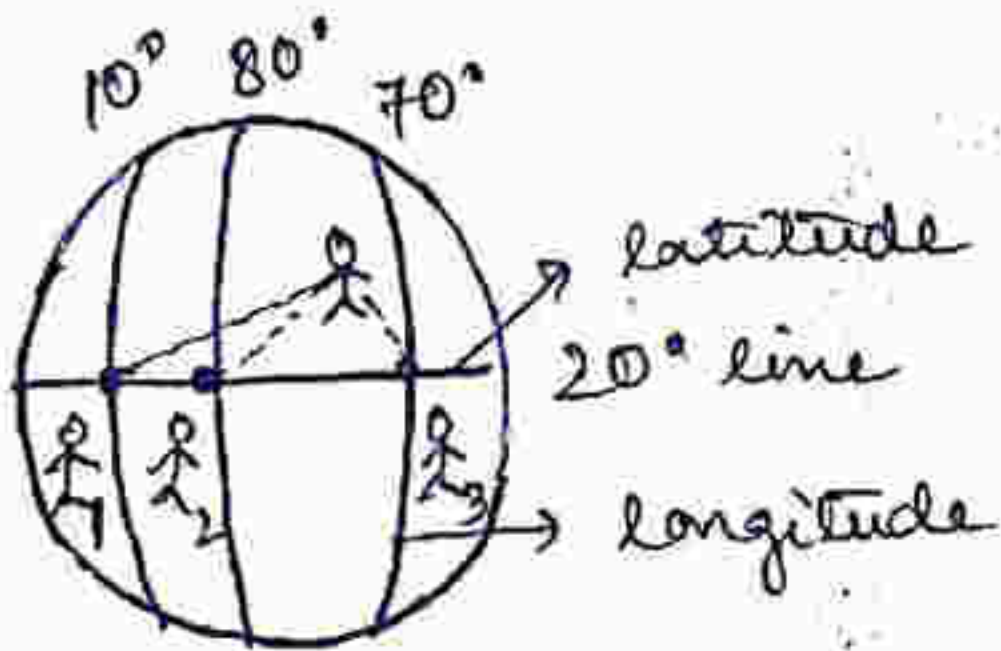
Meteoroids → relatively smaller  
 → revolves around sun

meteor (burn completely)  
 meteorite (don't burn completely)



Globe - Latitudes - Longitudes (2)

(1)

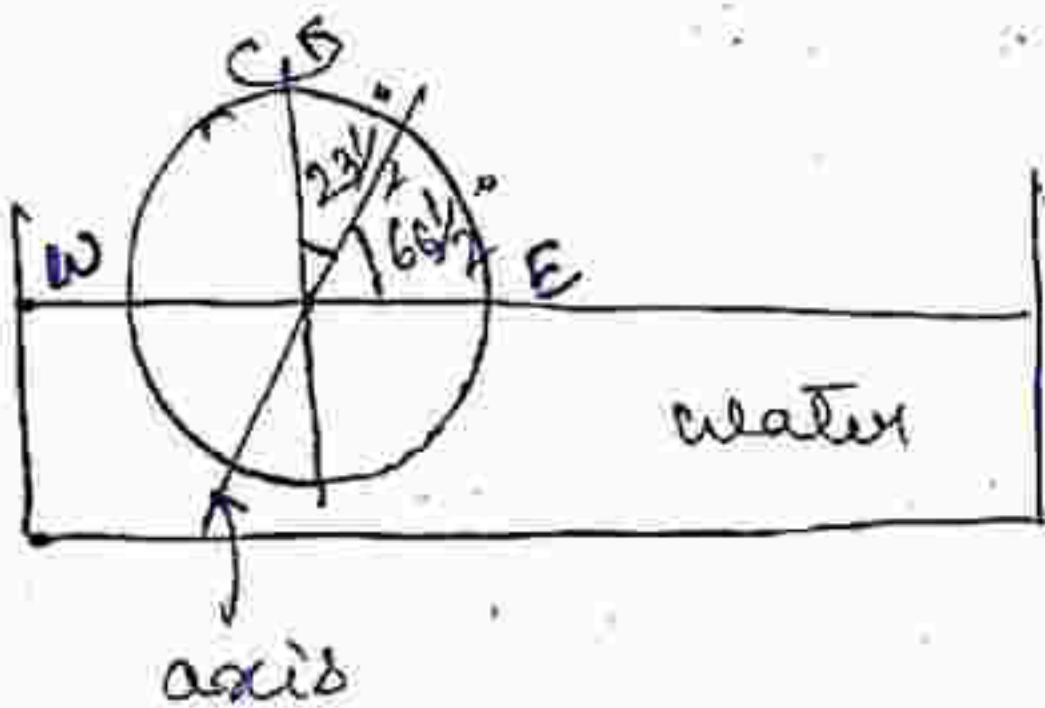


Stick figure 1 → 20° horizontal line  
10° vertical line

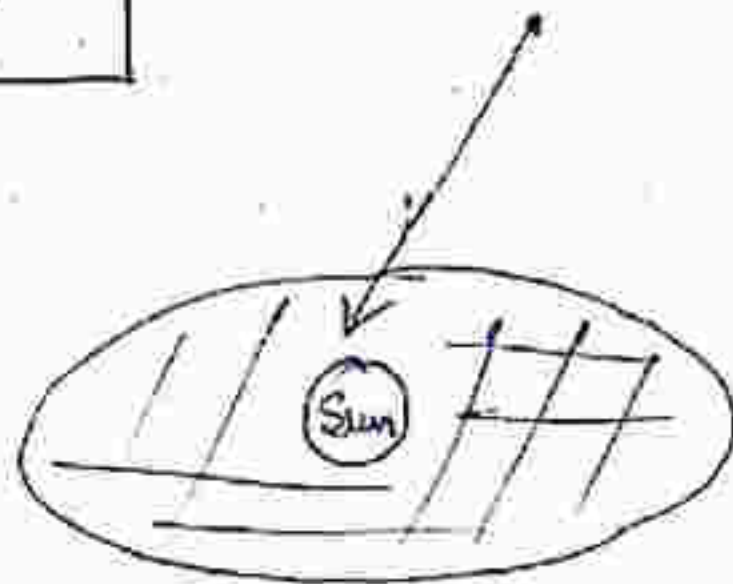
Stick figure 2 → 20° H, 80° V

Stick figure 3 → 20° H, 70° V

(2)



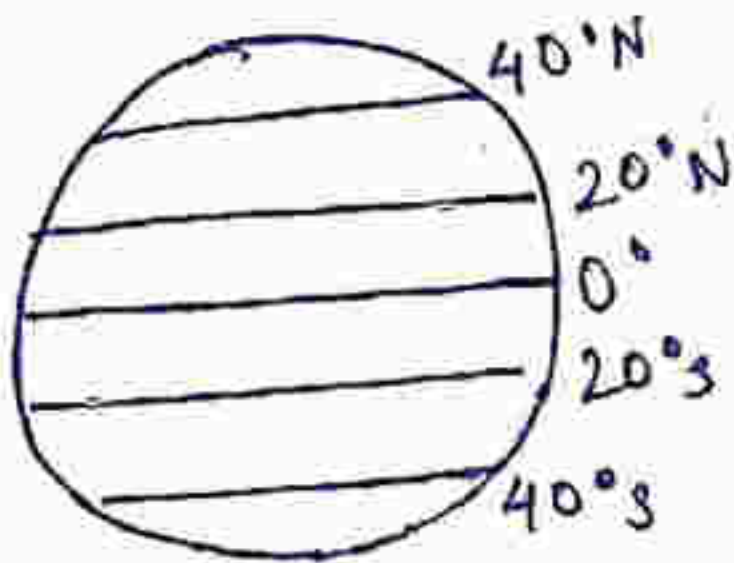
← elliptical plane/  
orbital plane



E → W : Venus, Uranus

**Latitudes**

(3)



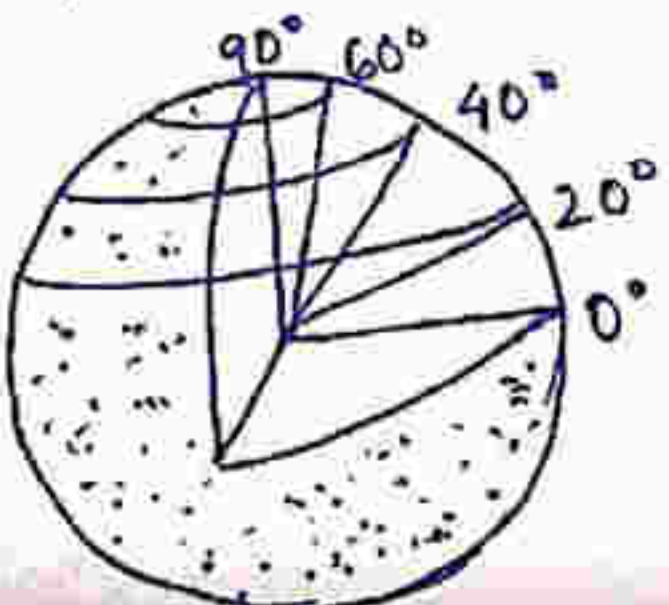
→ lines || to equator - latitudes

→  $0^\circ \begin{matrix} \uparrow N \\ \downarrow S \end{matrix}$  Equator

→ every latitude || to each other

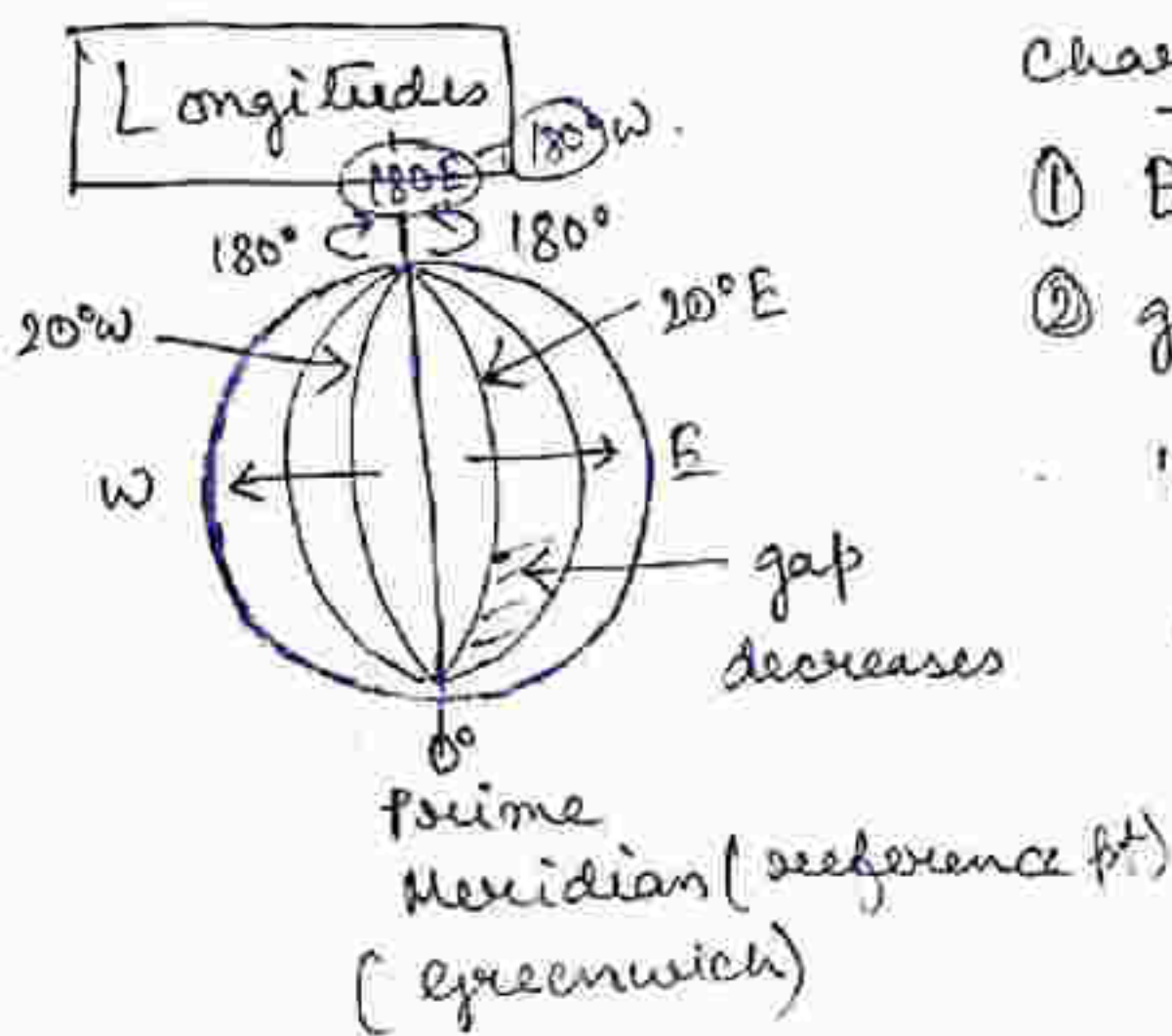
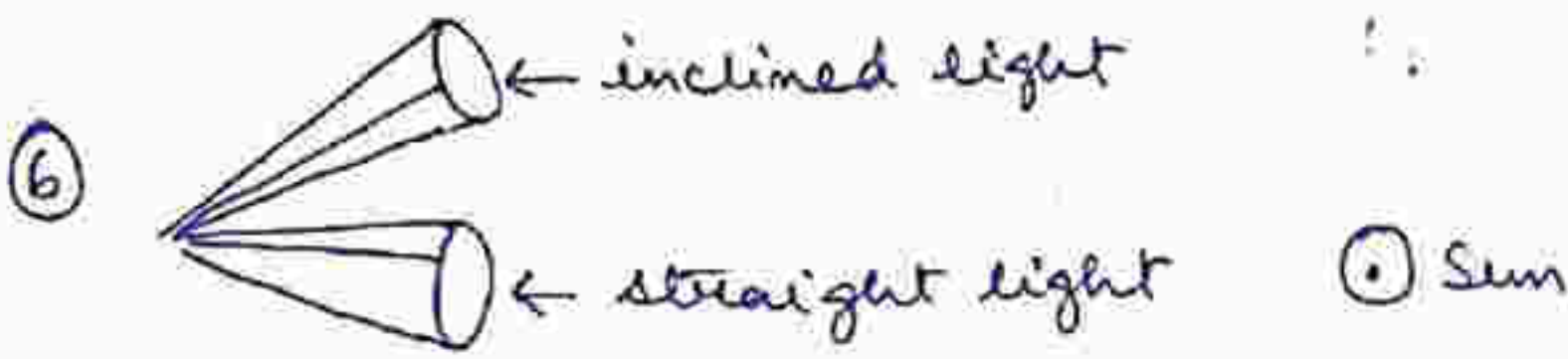
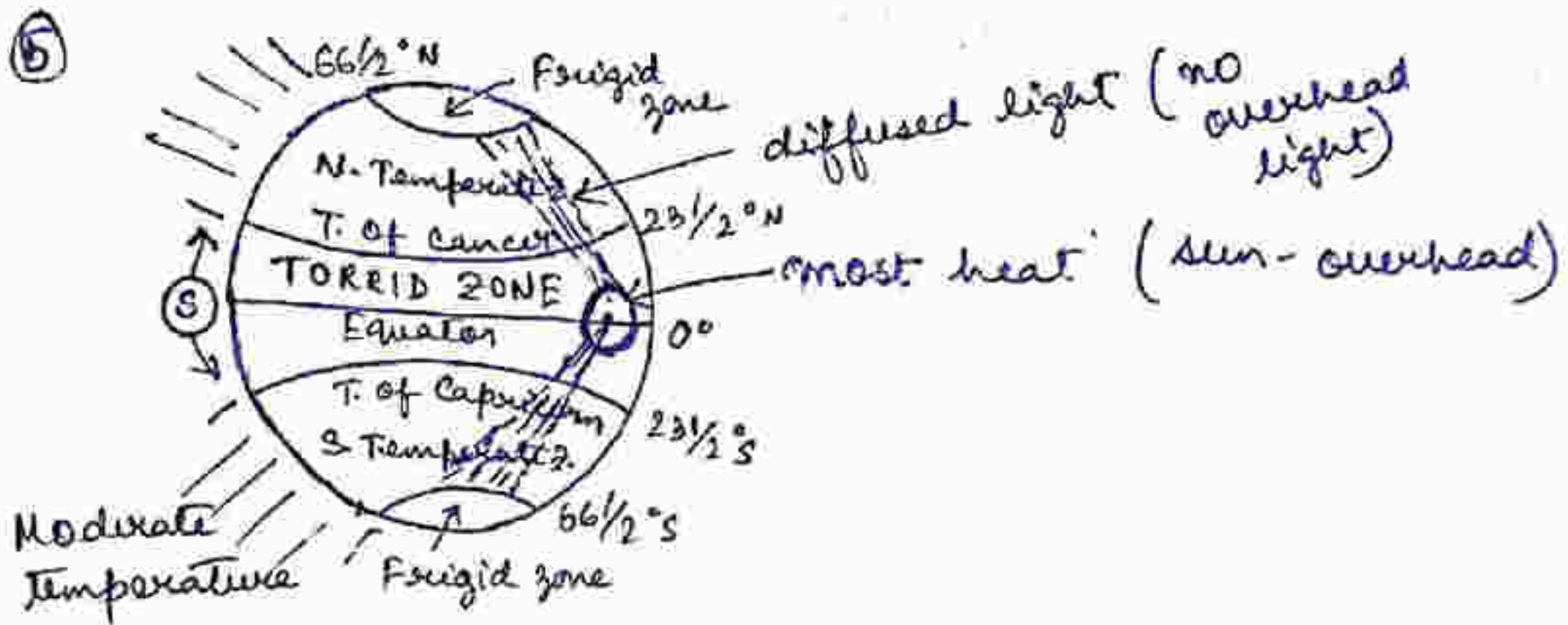
→ Latitudes are not of equal length

(4) Concept of degree: Centre of earth.



→ ∠ of inclination from centre of earth.



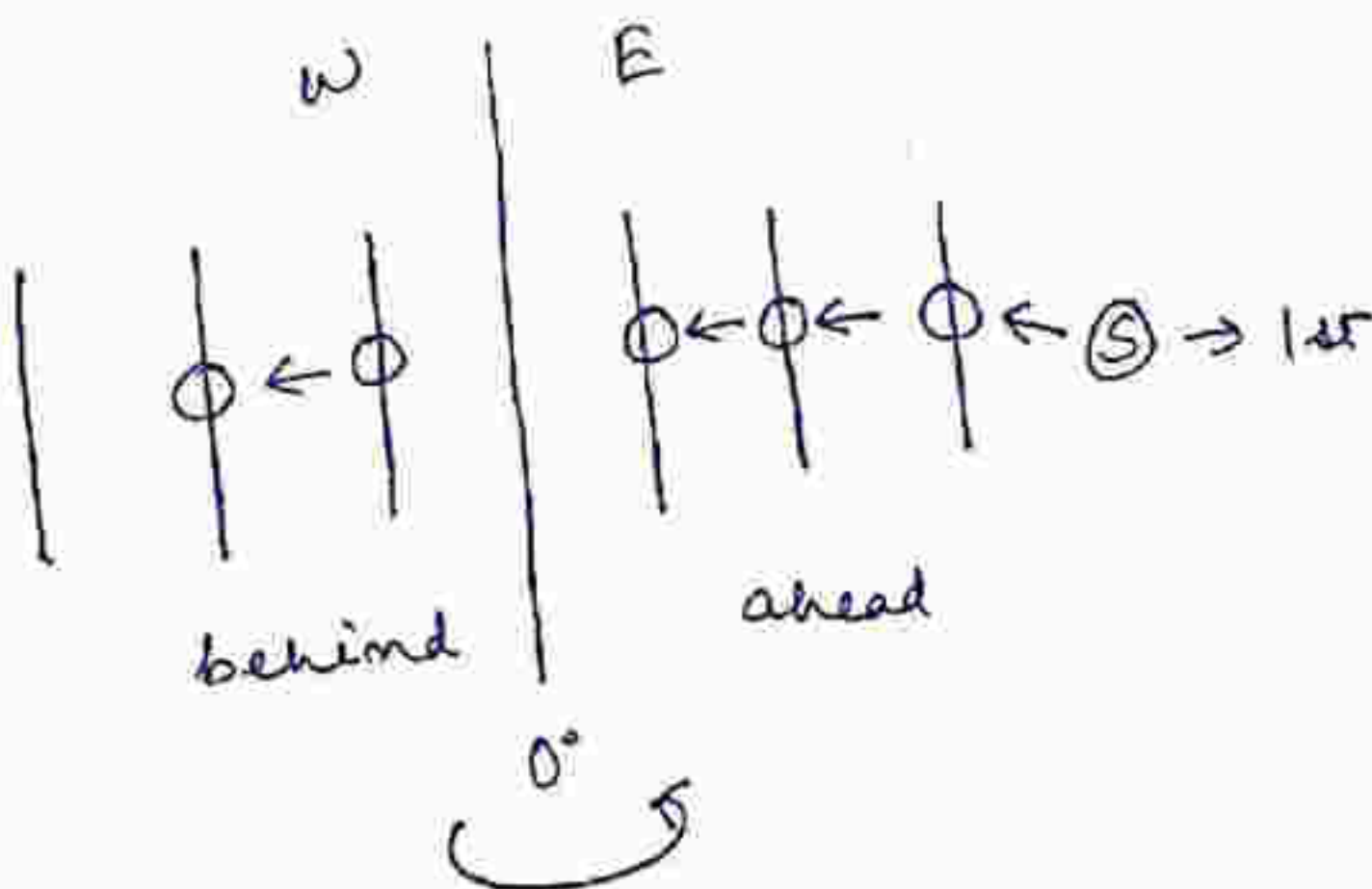


Characteristics:

- ① Equal length
- ② gap decreases polewards.

$180^\circ E = 180^\circ W$  (diametrically <sup>opposite</sup> ~~time~~ to each other)  
 ↓  
 International date line

Longitude and time



Local time of a place is fixed w.r. to the path of the sun in the sky. It is 12 near local time when the angle of inclination of the sun is maximum. At that time the sun is crossing the longitude of that point





→ The earth rotates  $360^\circ$  in 24 hrs.

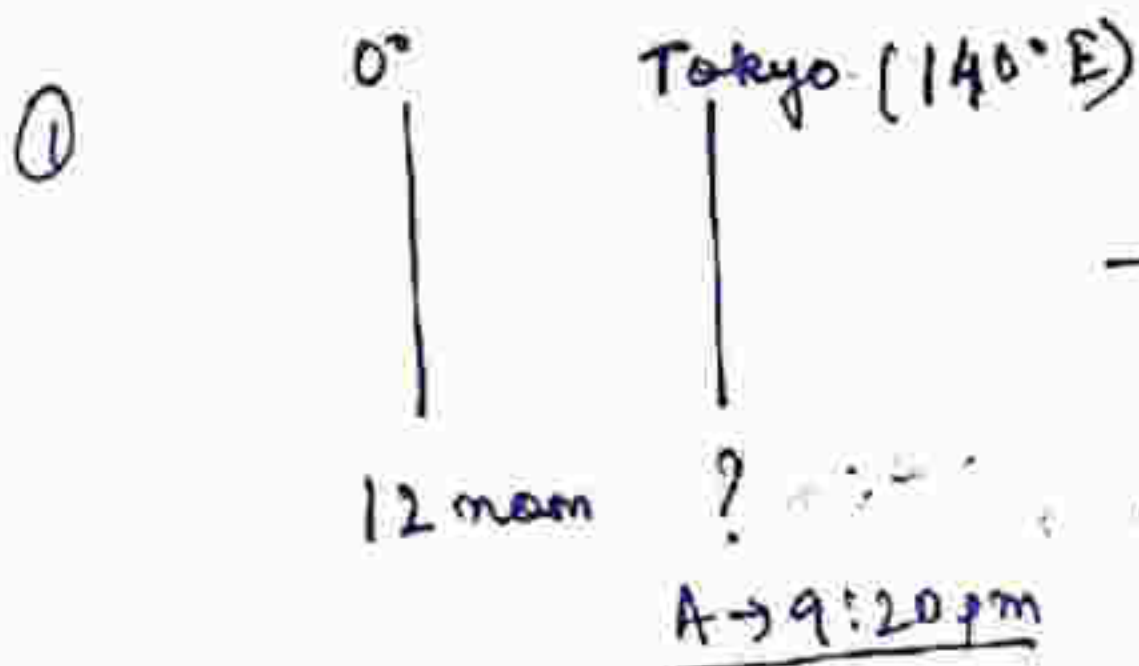
$$= 24 \times 60 \text{ mins}$$

$$1^\circ \text{ in } \frac{24 \times 60}{360} \text{ mins} = 4 \text{ mins}$$

Earth takes 4 mins to rotate  $1^\circ$

1 hr " "  $15^\circ$

30 mins " "  $7.5^\circ$



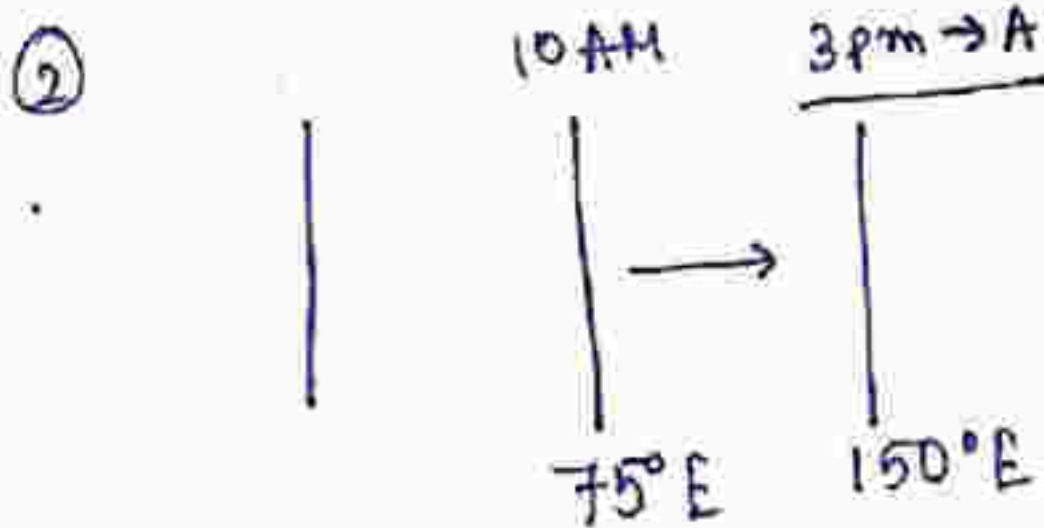
①

$$\rightarrow 140^\circ \times 4 = 560^\circ \text{ mins}$$

$$= 9 \text{ hrs } 20 \text{ mins}$$

$$\text{Tokyo time} = 12 \text{ noon} + 9 \text{ h } 20 \text{ mins}$$

$$= \underline{9:20 \text{ pm}}$$



②

$$\rightarrow \text{Difference in longitudes}$$

$$= (150 - 75)^\circ = 75^\circ$$

$$\text{Time difference} = 75^\circ \times 4 \text{ mins}$$

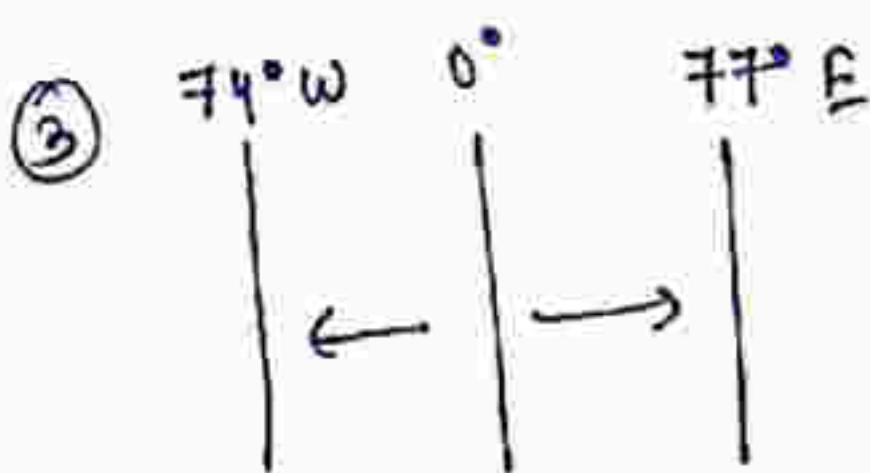
$$= 300 \text{ mins}$$

$$= 5 \text{ hrs.}$$

$$\rightarrow \text{Time at } 150^\circ \text{ E}$$

$$= 10 \text{ AM} + 5 \text{ hrs}$$

$$= \underline{3 \text{ pm}}$$



③ Longitude difference:

$$= (74^\circ + 77^\circ) = 151^\circ$$

$$\therefore \text{Time difference} = 151^\circ \times 4$$

$$= 604 \text{ mins}$$

$$= 10 \text{ hrs } 4 \text{ mins}$$

→ Standard time:

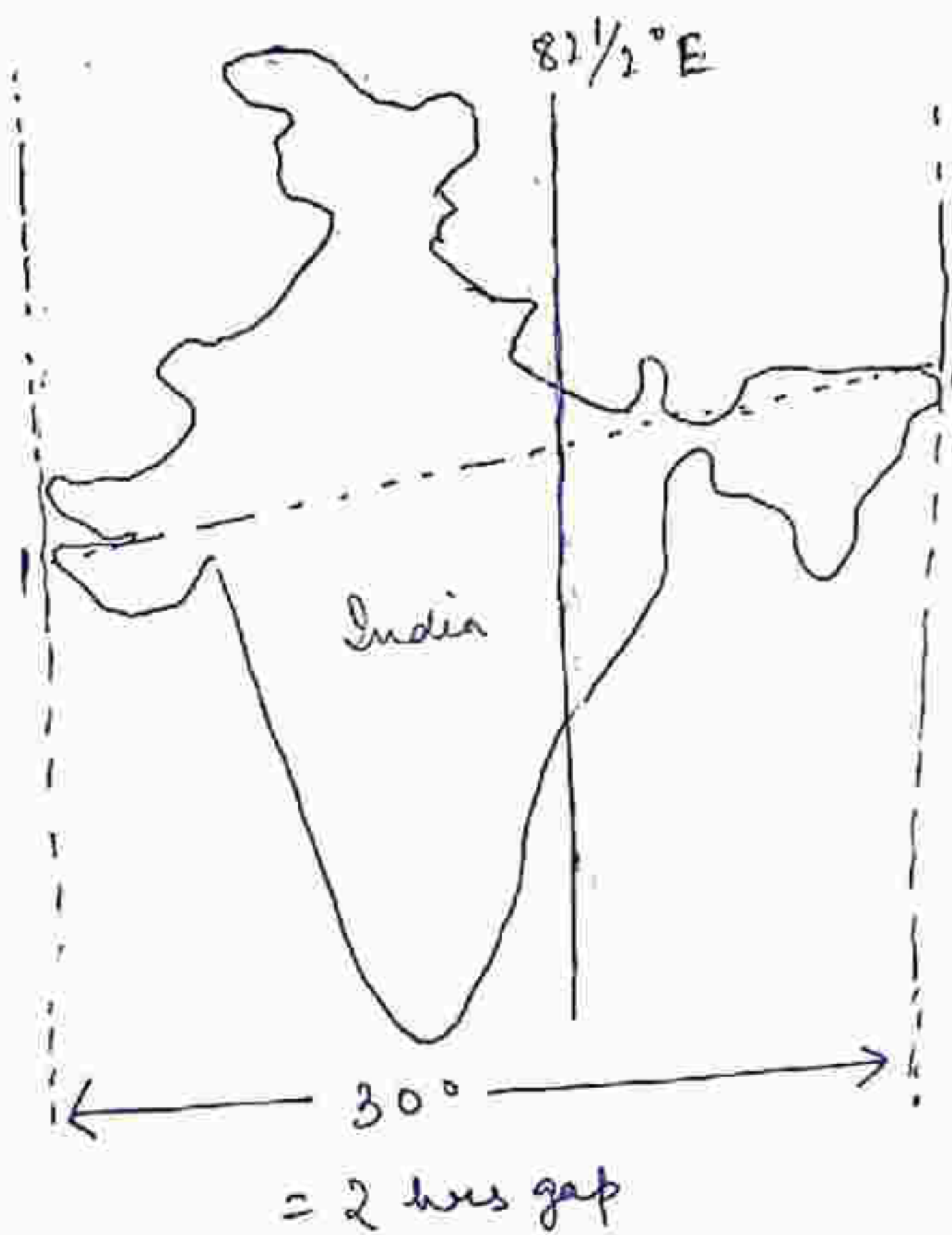
To avoid confusion, we follow uniform time throughout a country or a region. Such uniform time is based on the central meridian of the country or the meridians on which imp cities are located.



Such a central meridian is called standard meridian.

$82\frac{1}{2}^{\circ}$  E is a standard meridian for India

The central meridian is selected in such a way such that it is divisible by  $7\frac{1}{2}^{\circ}$  so that the standard time differs from GMT by a multiple of  $\frac{1}{2}$  hour.



→ ① standard meridian passes through:  
cities:  
states:

- ② countries T. of Cancer cuts
- ③ countries T. of Capricorn cuts
- ④ Equator → countries.
- ⑤ states T. of Cancer cuts
- ✓ ⑥ River that (Indian) crosses T. of Cancer twice! R. Mahi
- ⑦ R. that crosses T. of Capricorn twice - R. Limpopo
- ⑧ R. " cuts equator twice - Congo.



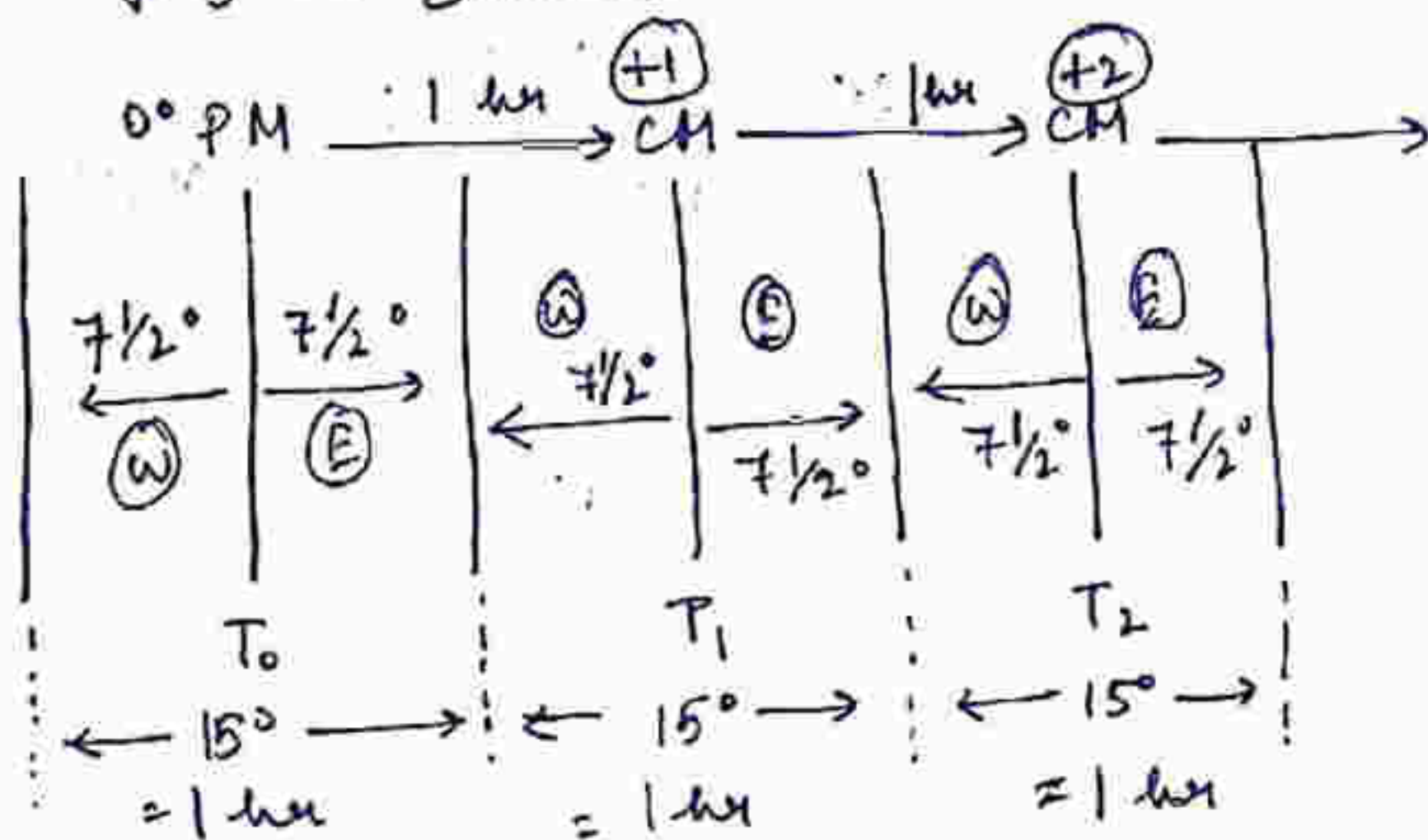
→ Time zones:

→  $360^\circ \rightarrow 24$  hrs

$15^\circ \rightarrow 1$  hr

$7.5^\circ \rightarrow 30$  mins

Time zones in the world  
= 24



⇒ Time zones:

- ① The world is divided into 24 standard time zones each extending over  $15^\circ$  of longitudes ( $15^\circ \times 4 = 60$  mins)
- ② The local solar time of Greenwich was chosen as the standard for entire system.
- ③ The PM became the centre of the time zone that extends  $7\frac{1}{2}^\circ$  of longitudes both to E and west of PM
- ④ Similarly the meridians that are multiple of  $15^\circ$  both E and W of PM were set as central meridians for 23 other time zones, each of which is  $15^\circ$  of longitude in extent.
- ⑤ 12 zones to the east of Greenwich meridian to be designated to be ahead of time at Greenwich by 1 hr / zone.

Similarly, 12 zones to the west of Greenwich are behind time.



- ⑥ In the international waters, these time zones are shown exactly  $7\frac{1}{2}^{\circ}$  E and  $7\frac{1}{2}^{\circ}$  W of Central Meridians.
- ⑦ Over land area, however, the actual eastern and western boundaries may coincide with political and economic constraints  
[India]
- ⑧ Large countries with vast longitudinal expanse do not have single standard time for whole country. Generally, such countries go for more than one time zone [each approx  $15^{\circ}$  long.]

eg. Australia - 3 time zones

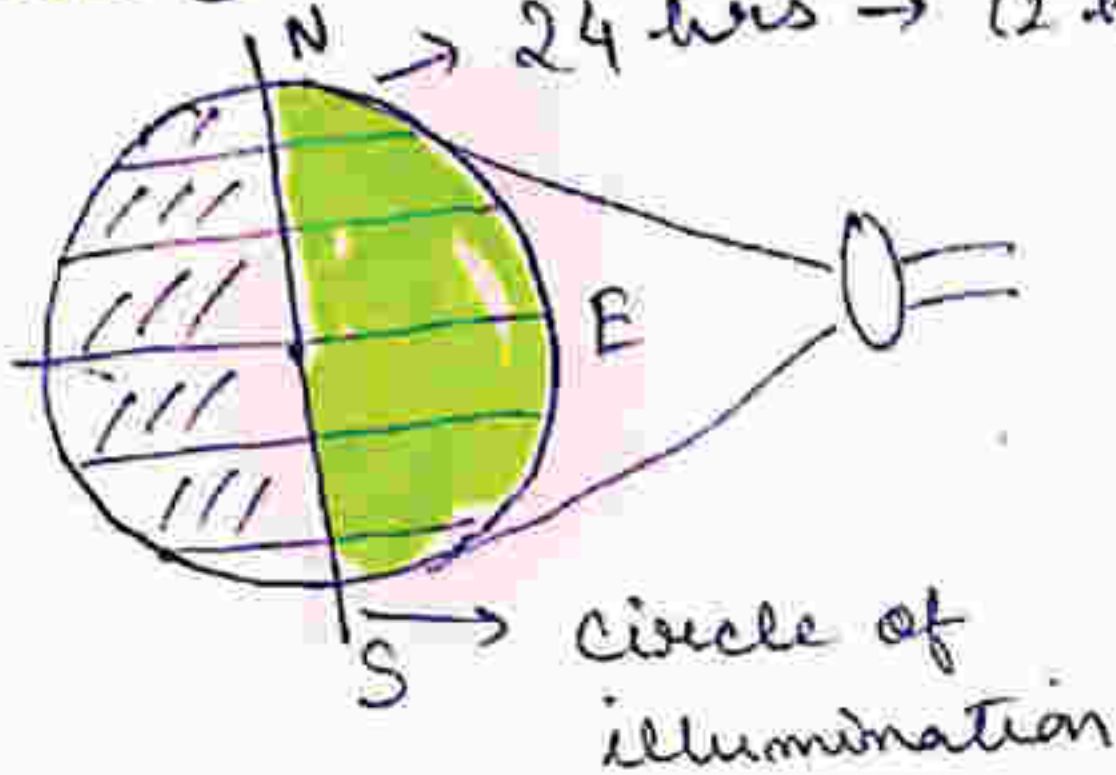
Russia - 11 time zones

Although China extends across four  $15^{\circ}$  ( $4 \times 15^{\circ}$ ) the entire nation at least officially observes the time of  $120^{\circ}$  E meridian.



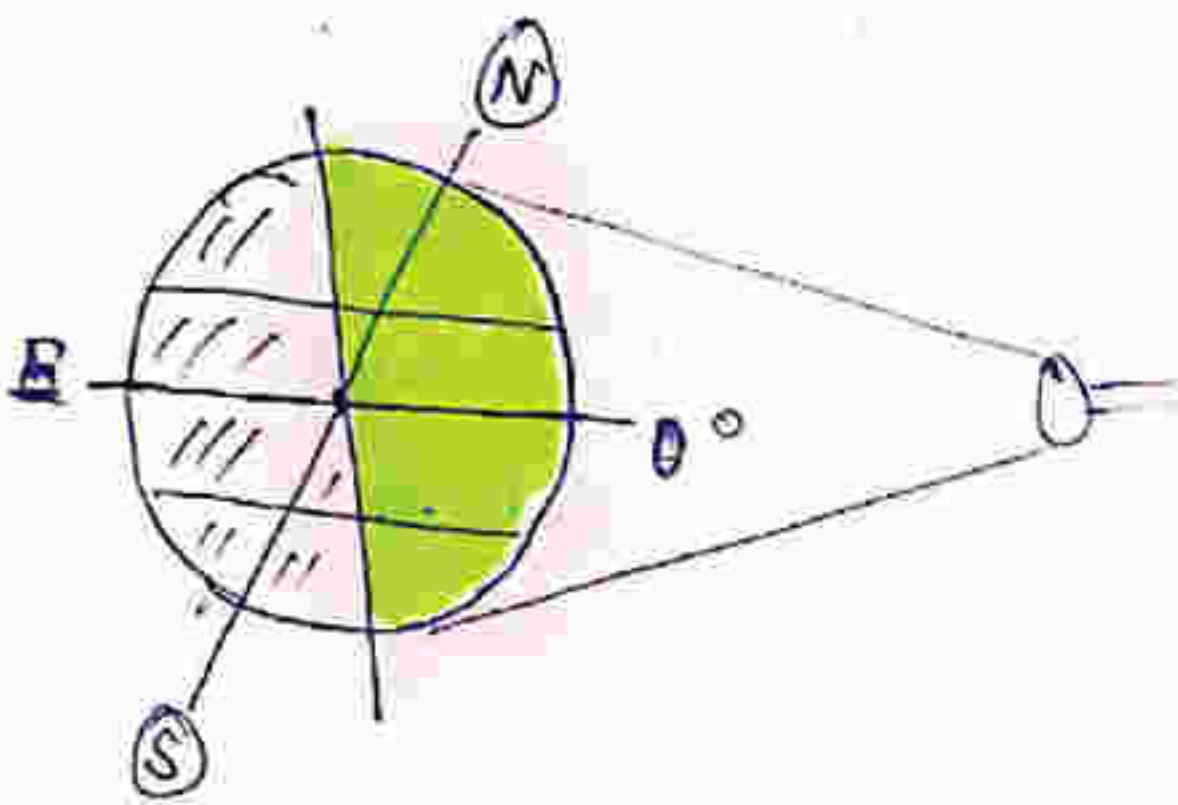
## Motions of the Earth ①

Case ① → 24 hrs → 12 hrs day - night.



When earth is not tilted

Case ②

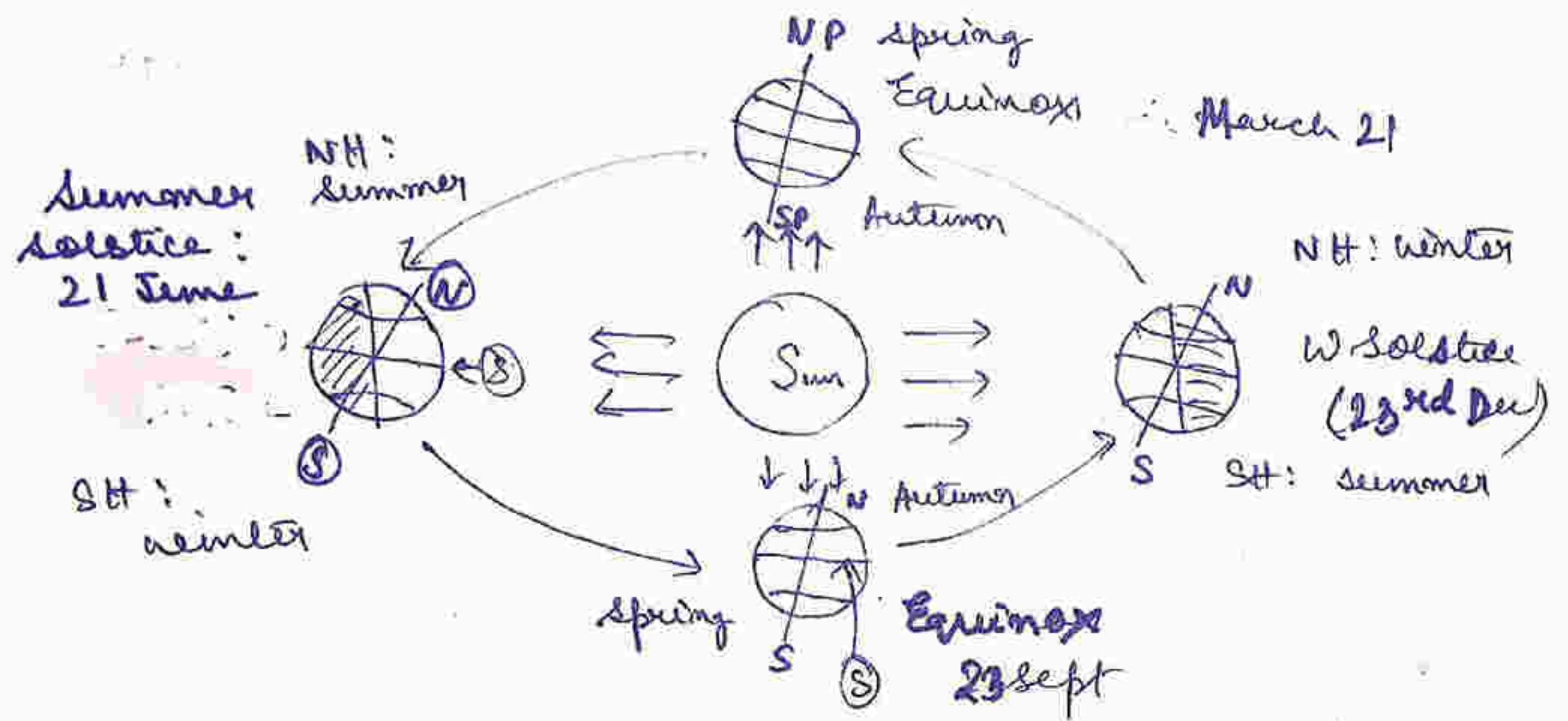


Tilted earth; days, nights not equal in either hemisphere

→ Circle of illumination

Sun illuminates  $\frac{1}{2}$  of the earth at any given moment. The edge of the sun lit hemisphere is called C.I. It is a great circle that divides the earth into light half and dark half.







- ②
- ① Winter solstice: (apparent position of sun above T. of Capricorn)
- ① Circle of illumination excludes the NP region from sunlight and includes the SP region.
  - ② The NH is tilted away from more direct rays of sunlight, thereby creating a lower angle for the incoming solar rays and more diffused insolation. (Thus causing our northern winter)
  - ③ From  $66\frac{1}{2}^{\circ}\text{N}$  -  $90^{\circ}\text{N}$  the sun remains below the horizon the entire day, thus it experiences 24 hrs darkness.
  - ④ During the following 3 months, daylength and solar angle gradually increases in NH as earth completes  $\frac{1}{4}$ th of its orbit.
- ② March equinox: (Vernal equinox) [Apparent position of sun above equator]
- ① CI passes through both the poles so, that all locations on earth experience 12 hrs day and 12 hrs night.
- ③ Summer solstice [apparent position of sun above T. of Cancer]
- ① NH is tilted towards more direct sunrays thus causing our northern summer.
  - ② CI now includes NP region. Everything north of Arctic circle receives 24 hrs of daylight (Midnight sun)
  - ③ In contrast, the region from Antarctic circle to SP is in darkness the entire day
- ④ Autumn Equinox (sept.) [apparent position of sun above equator]
- ① CI passes through both the poles so, that all parts of the earth experience a 12 hrs day and 12 hrs night.



③

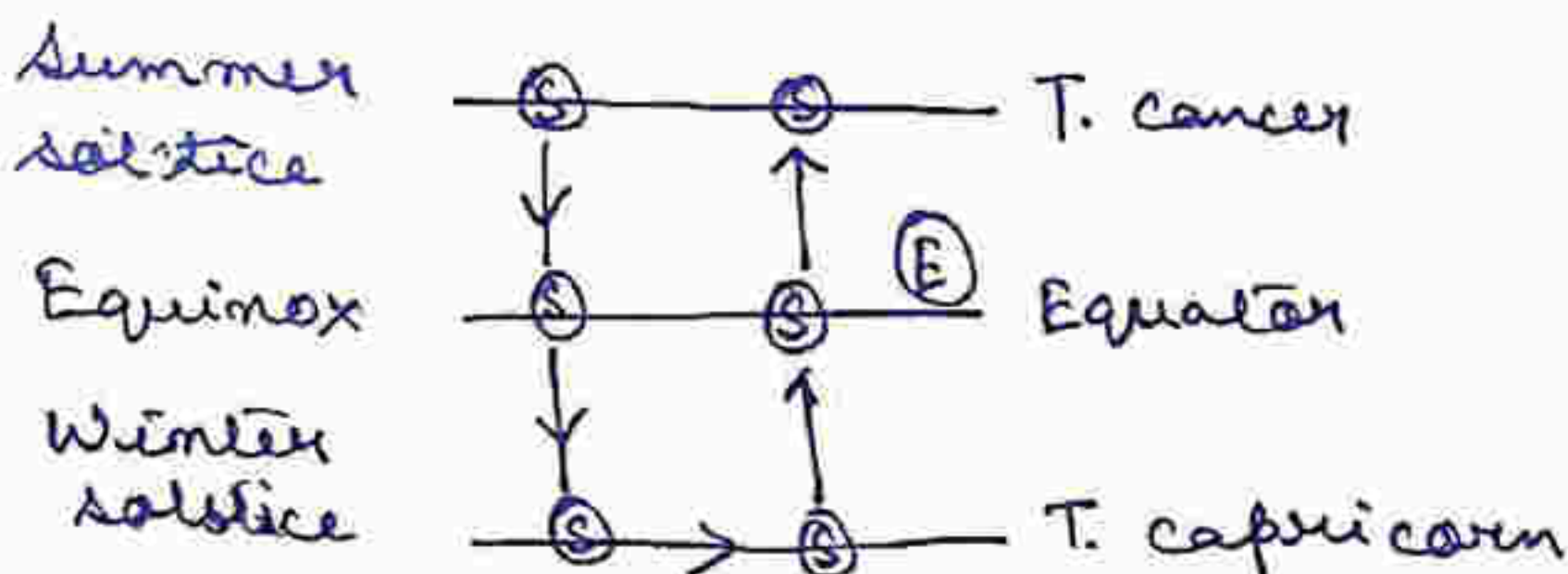
→ Reasons for seasons:

- ① Earth's revolution in its orbit around the sun.
- ② Earth's daily rotation on its axis.
- ③ Tilt of the earth's axis.
- ④ The unchanging orientation of earth's axis (axial parallelism)
- ⑤ earth's spherical shape.

→ Solstice - sun standing still or sun reaching highest position in NH/SH

→ Tropic: (Latin word) - to take turn.

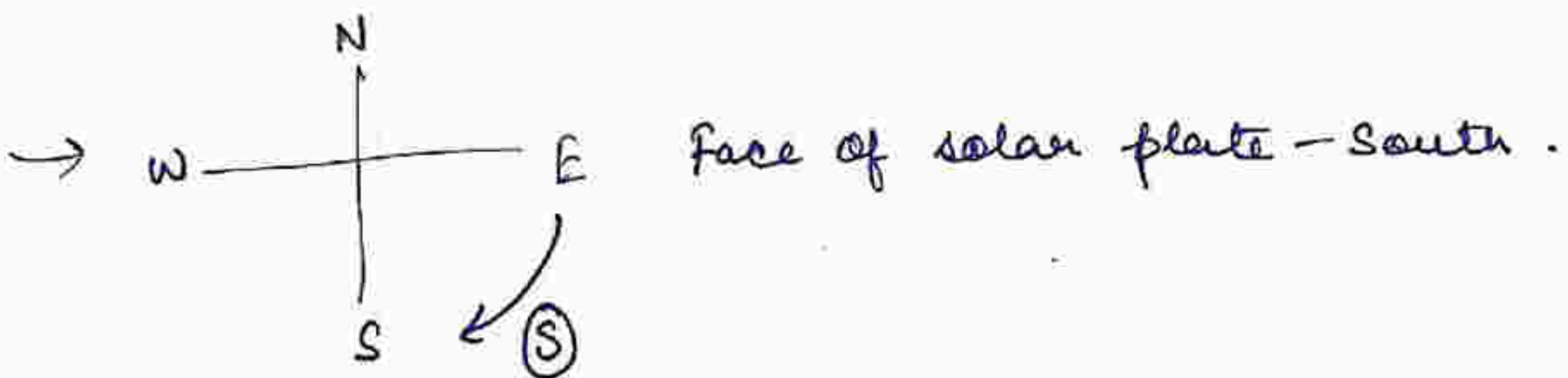
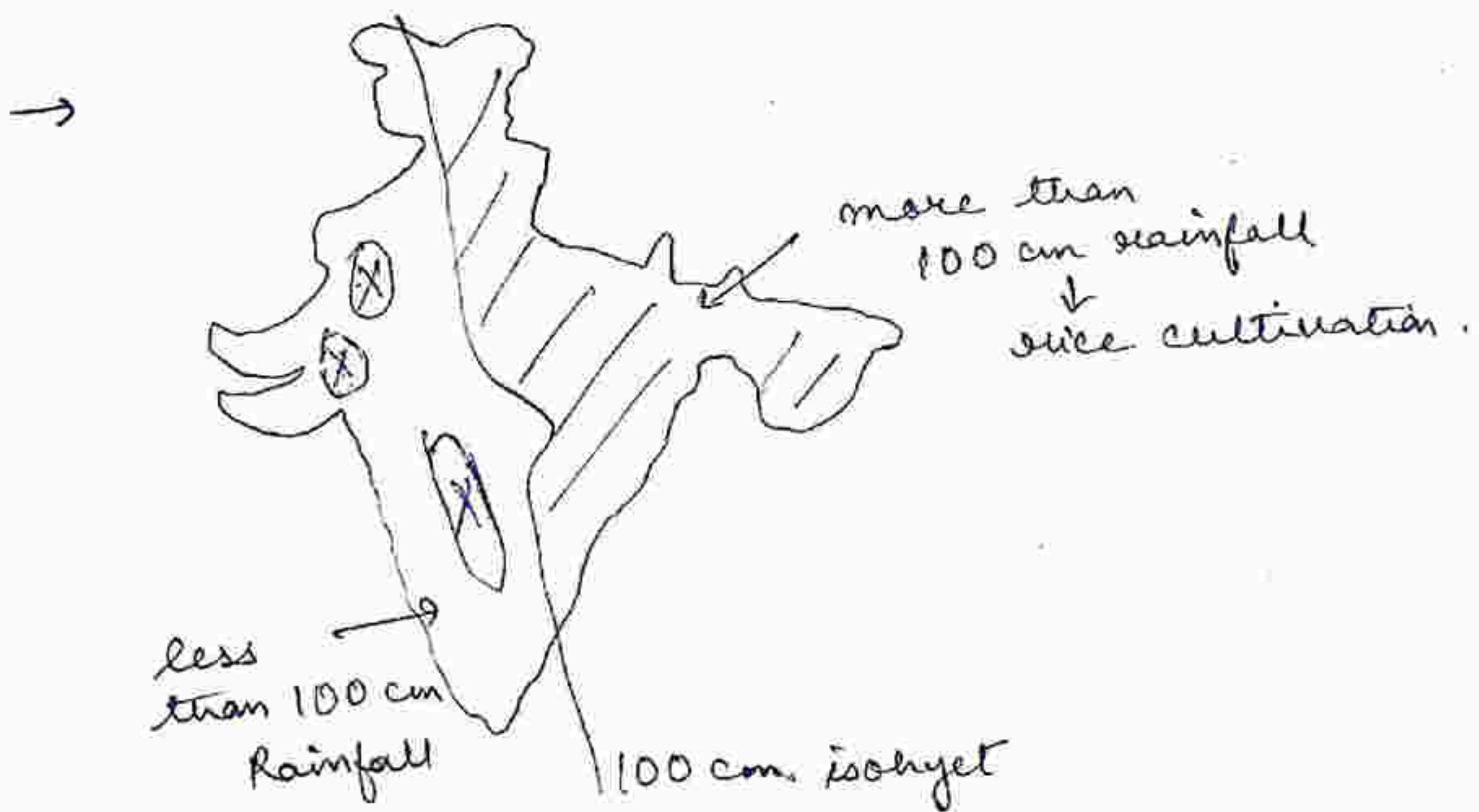
The parallel  $23\frac{1}{2}^{\circ}$  N and  $23\frac{1}{2}^{\circ}$  S are called tropics as they are parallel from where the sun appears to take a turn. Tropic is derived from Latin word 'tropicus' which means to turn or to change.





## Maps

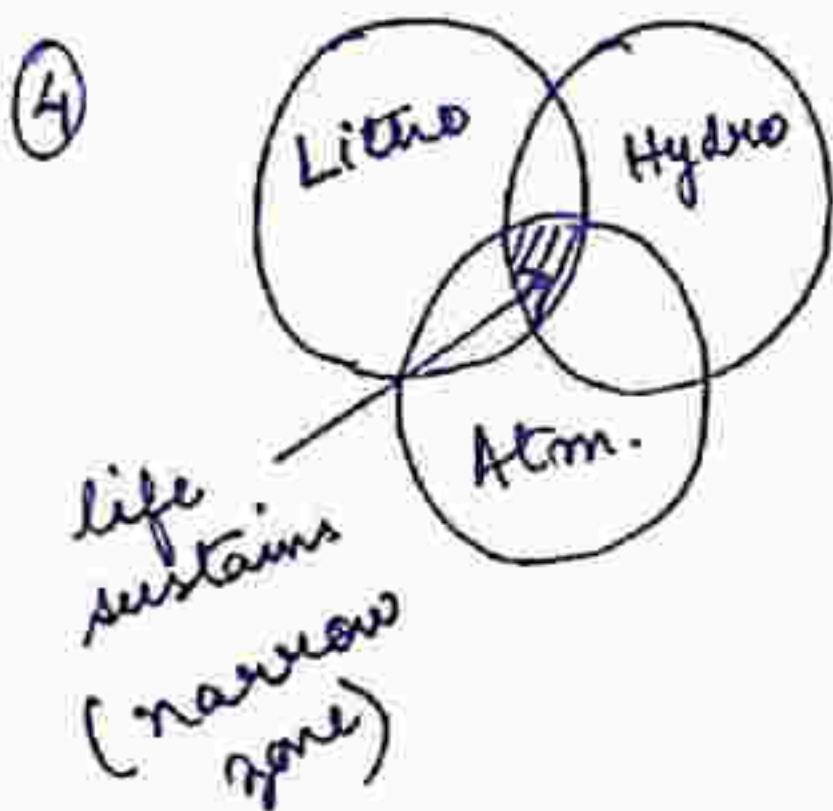
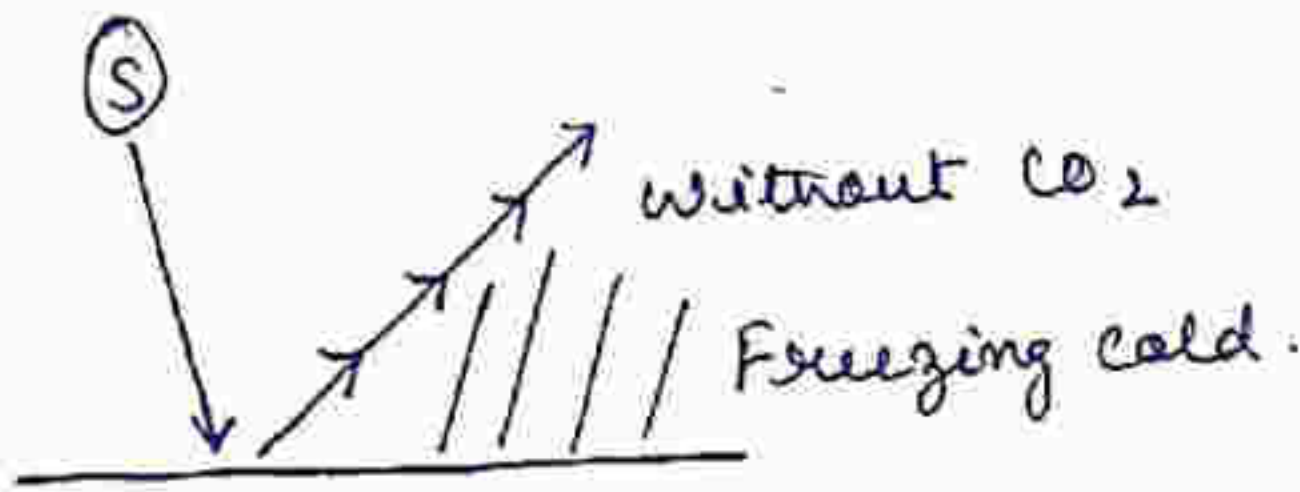
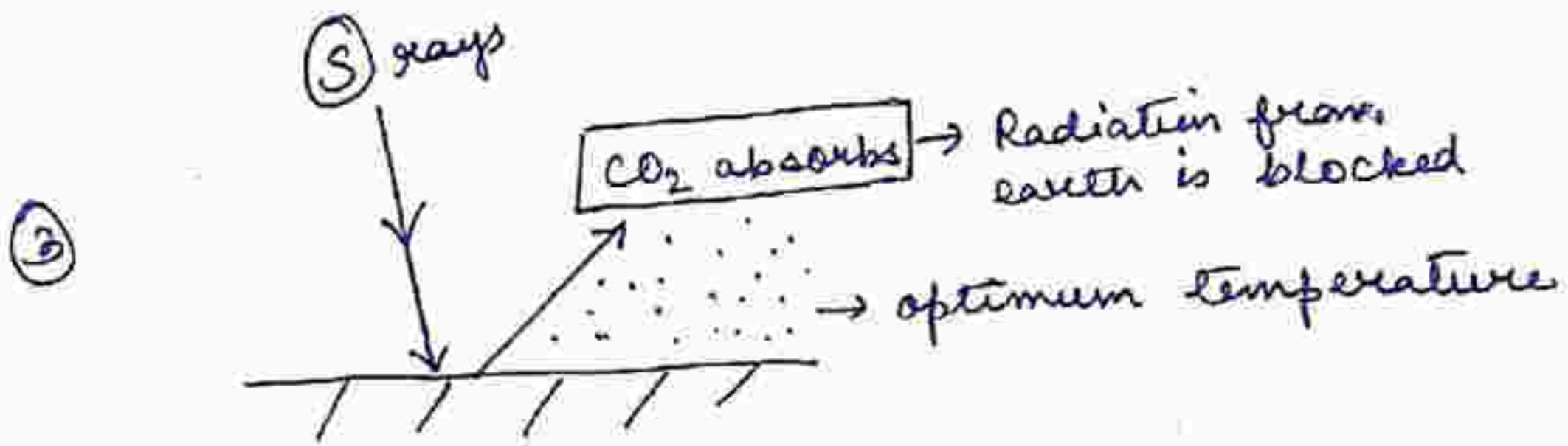
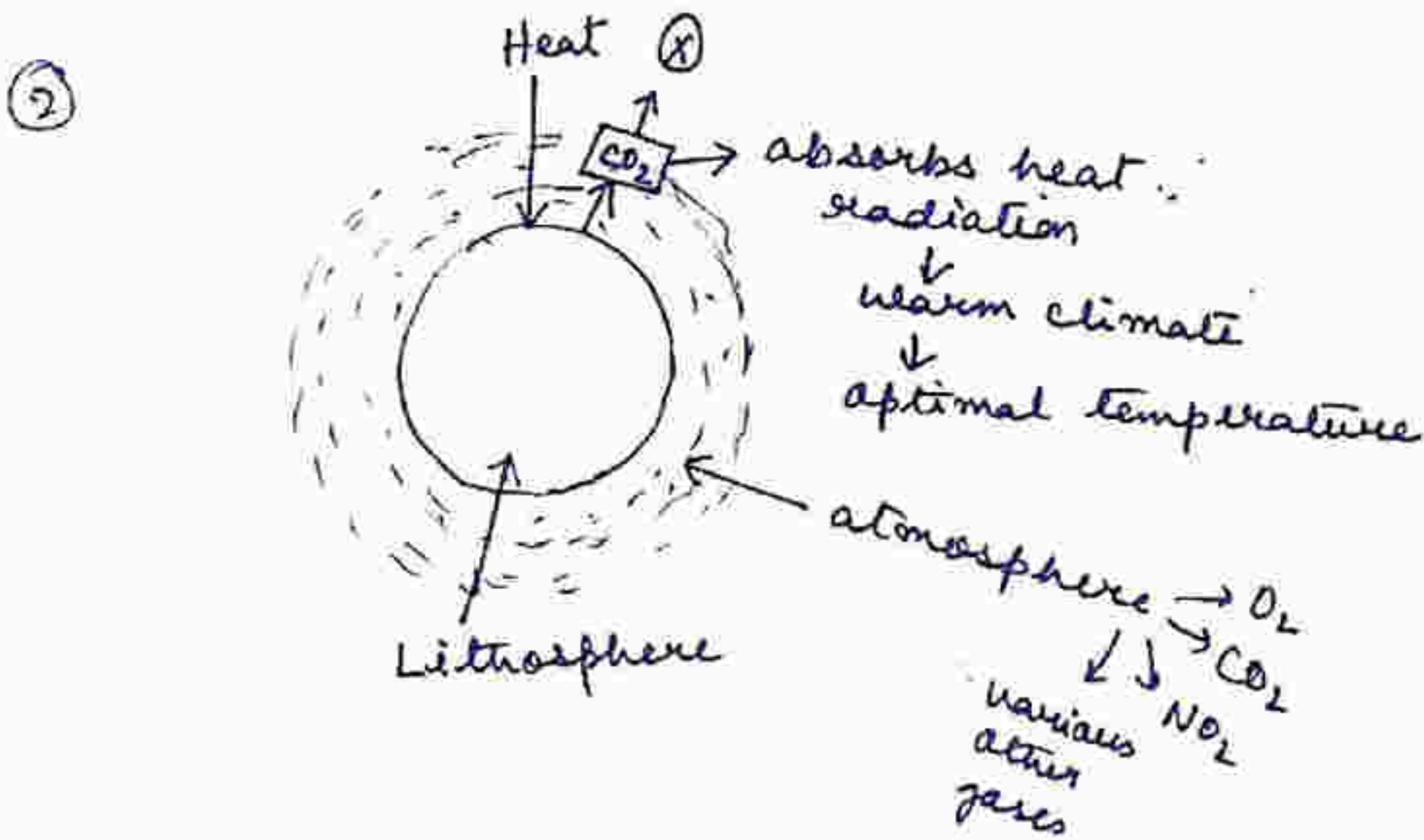
- ① Physical / Relief maps: features of earth - mts, plateaus, plains, rivers etc
  - ② Political maps - countries/states of world with boundaries, cities, towns etc.
  - ③ Thematic maps - focusing on specific information
    - road maps
    - rainfall maps etc.
- Macroscopic view → microscopic view (map)





Major domains of the Earth

① Life to get sustained - Land + water + air  
 ↓  
 Lithosphere [Lithos-stone]    Hydrosphere    atmosphere

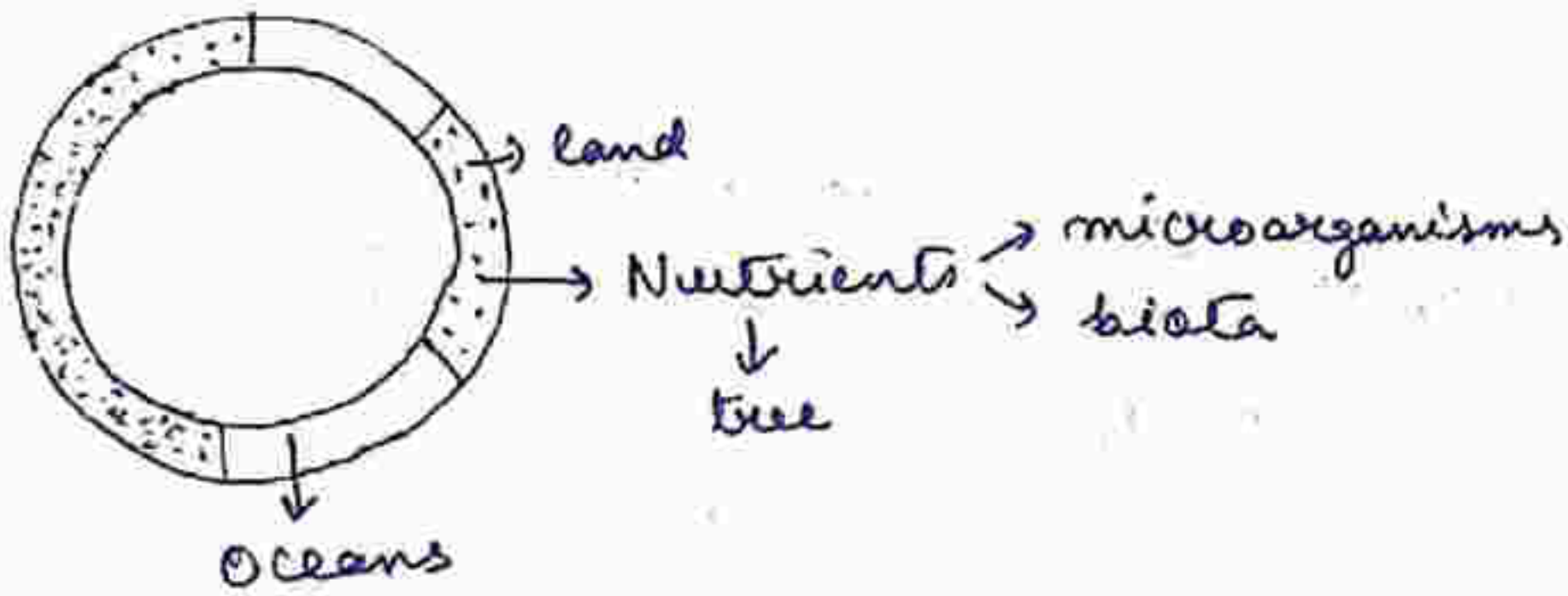


Biosphere:

A narrow zone where we find land, water and air together which contains all forms of life.



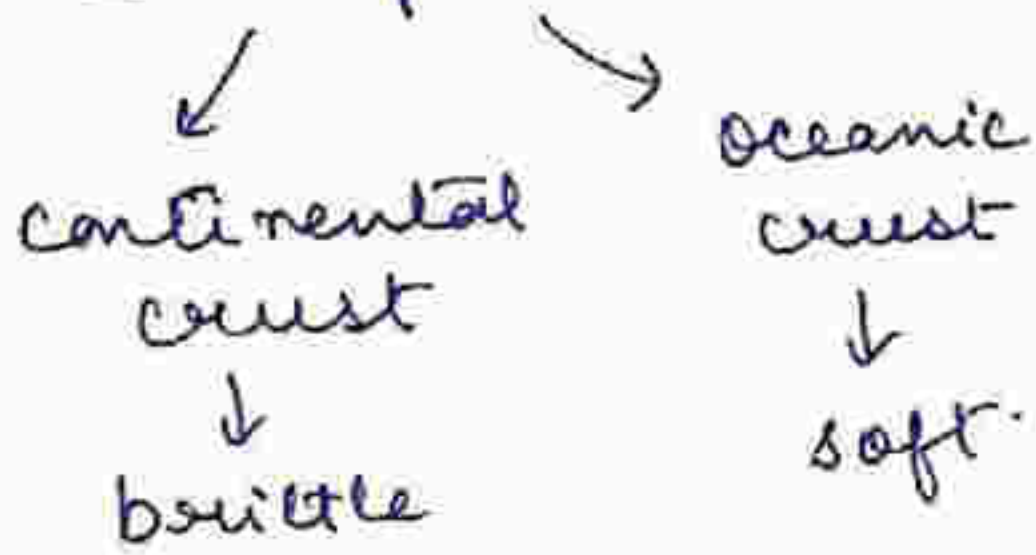
⑤



Oceans are connected → sea level same at every place (standard level of measuring) msl.

Any physical feature is measured from msl.

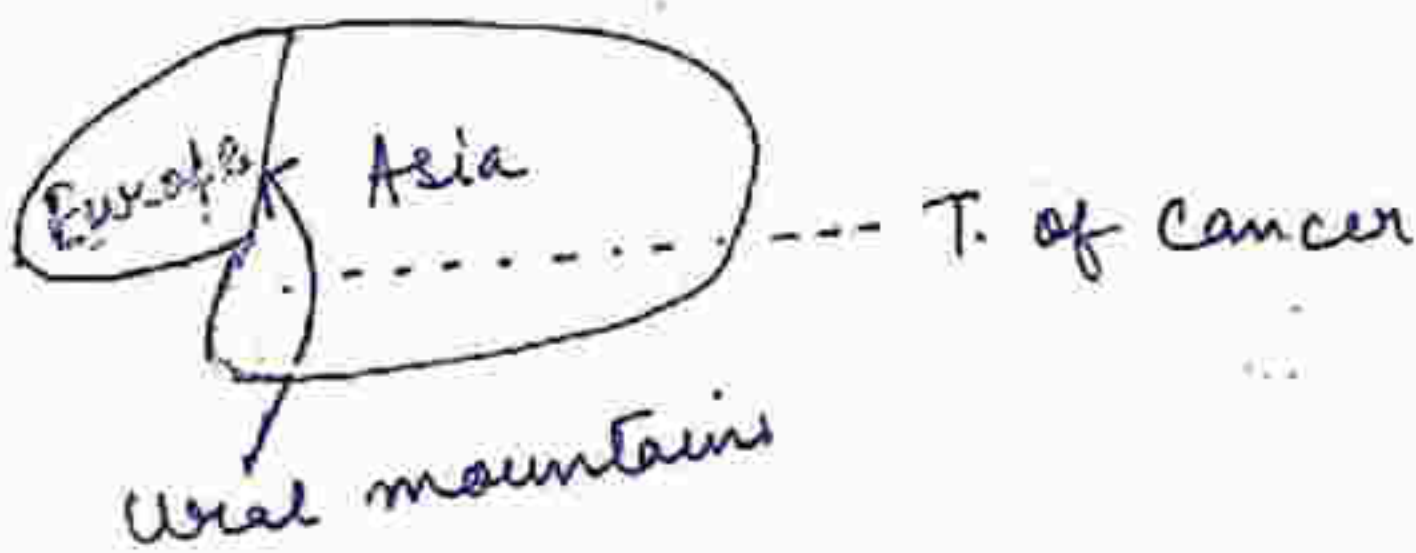
→ Lithosphere:



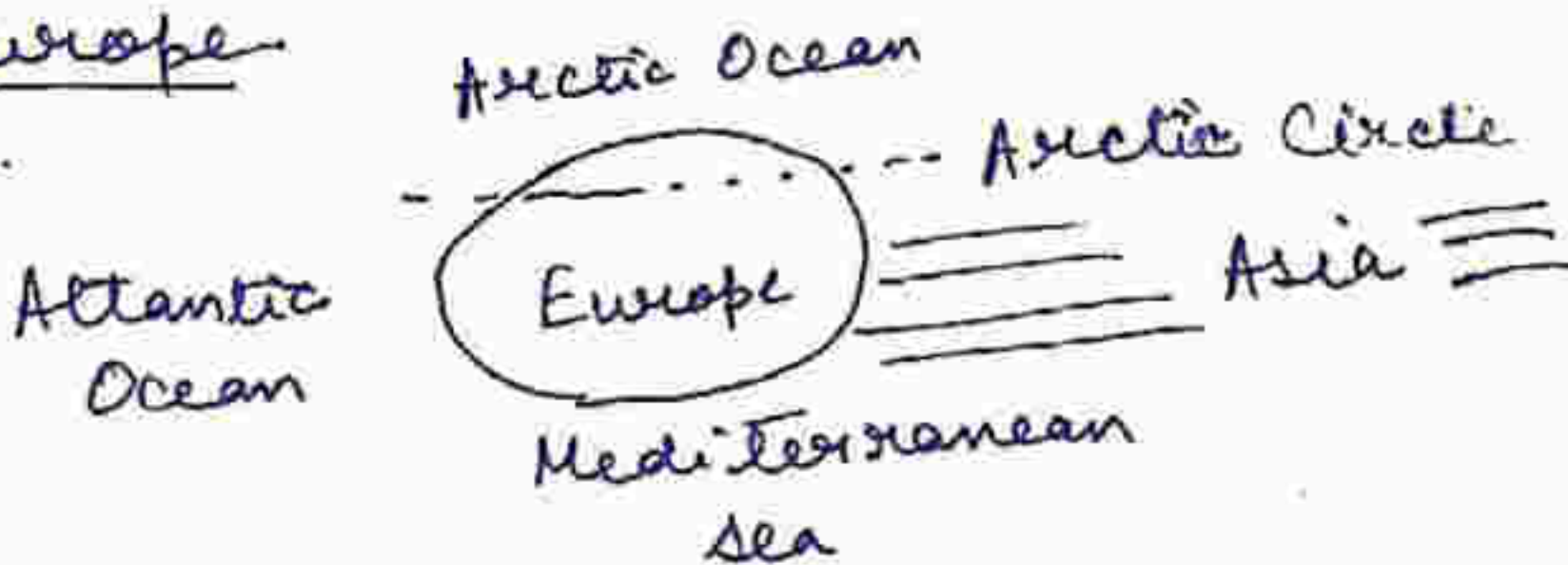
→ Continents.

① Asia - largest continent.

②

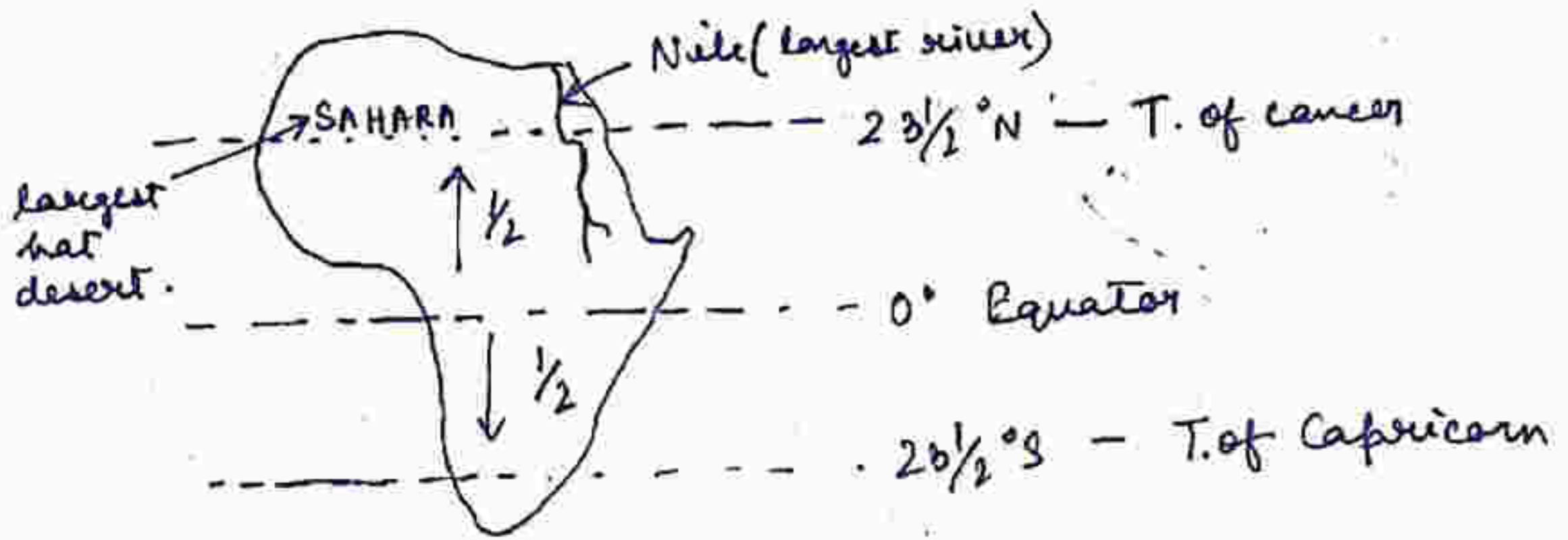


③ Europe



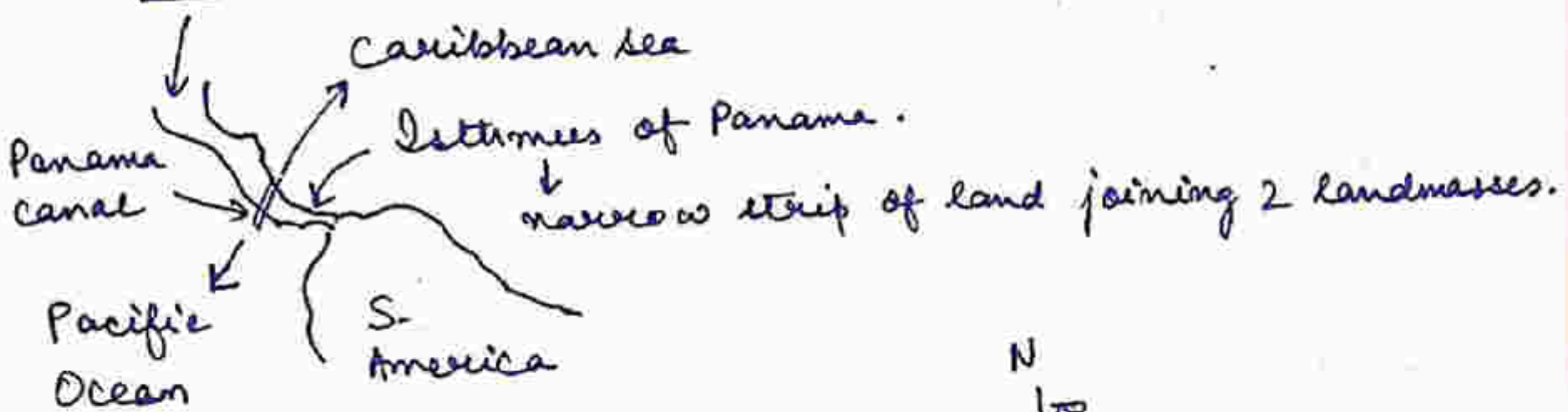


### ③ Africa

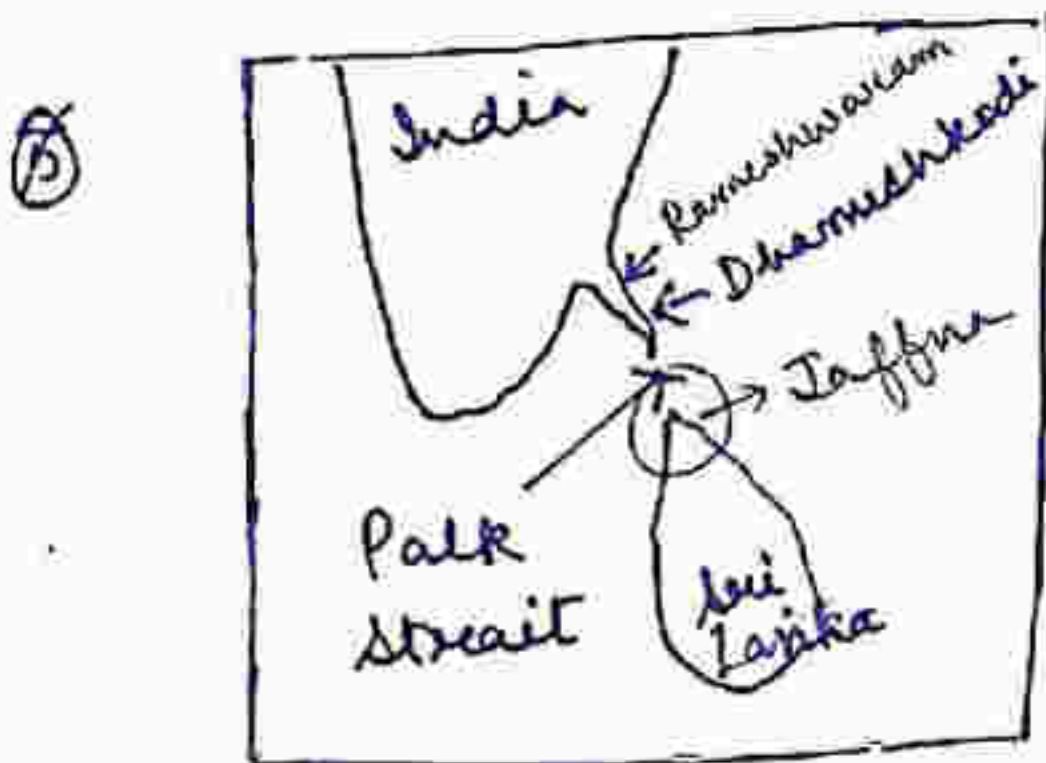


Africa: Most tropical country

### ④ N. America.



→ Mountain range of N. America!



isthmus - narrow strip of land joining 2 landmasses

strait - narrow passage of water connecting 2 large waterbodies (seas/oceans)

### ⑤ S. America:

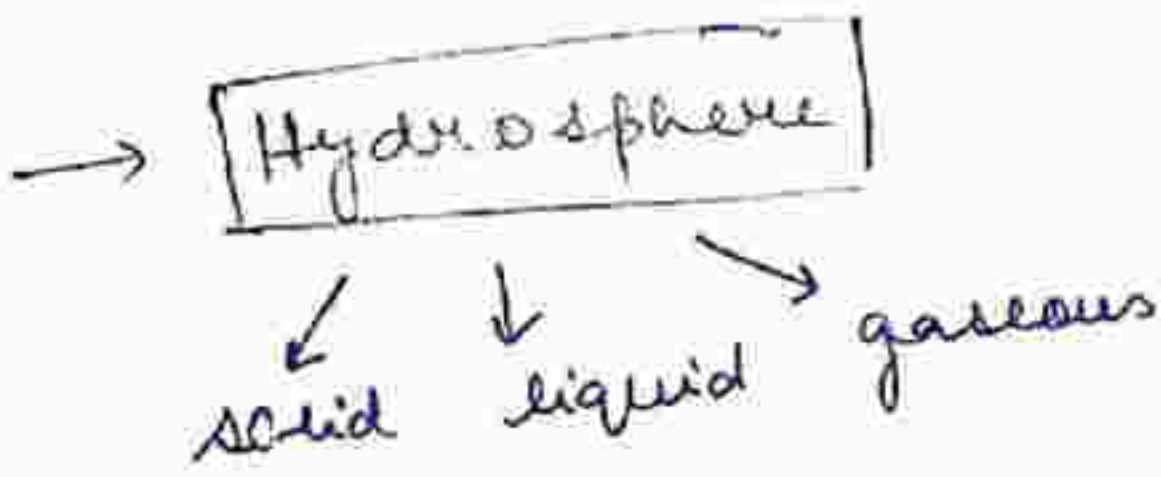
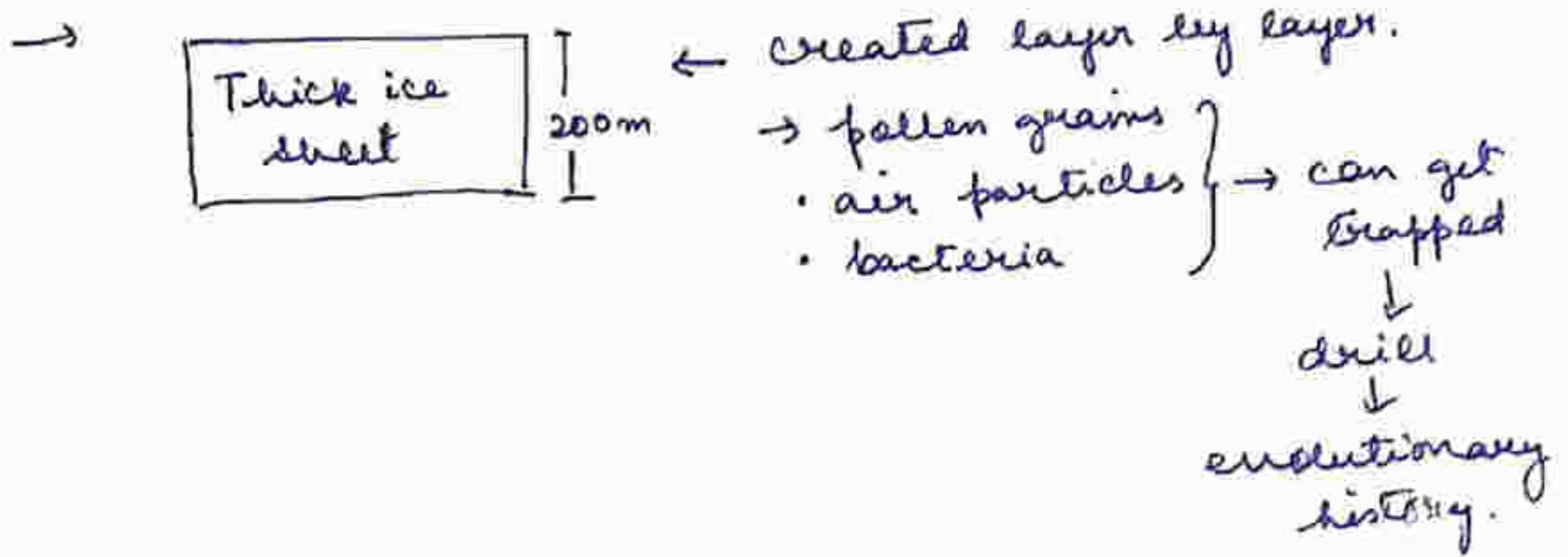
- N-S: World's largest mountain range: Andes
- Amazon: World's largest river
- L. Titicaca: b/w Andes mts.



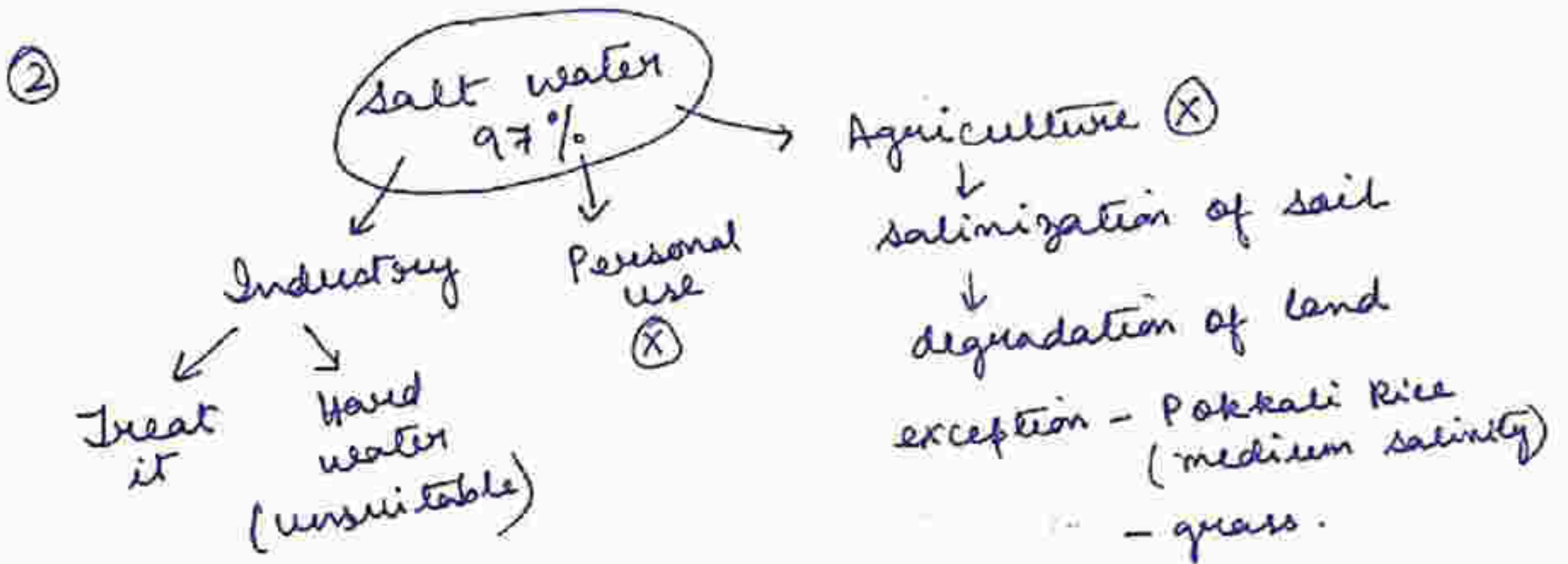
⑥ Australia - Island continent.

⑦ Antarctica -

Indian research stations: Maitri, Dakshin  
Gangotri



① water vapour in atmosphere - 0-4%



③ Movements of ocean water → waves  
→ tides  
→ ocean currents

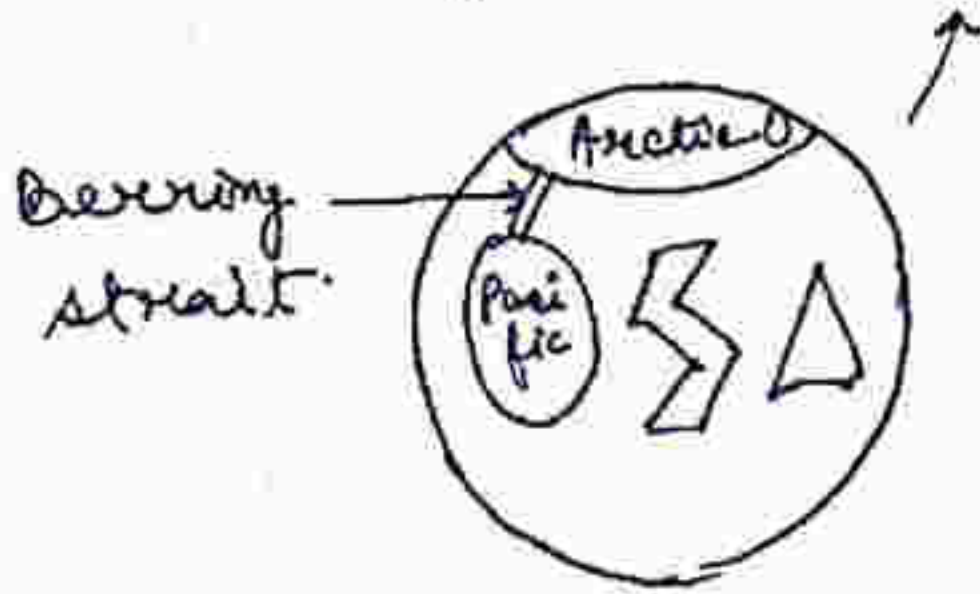
④ Deepest part of earth - Mariana Trench, Pacific Ocean

⑤ Indented coastline → fishing  
→ natural harbours  
→ ports

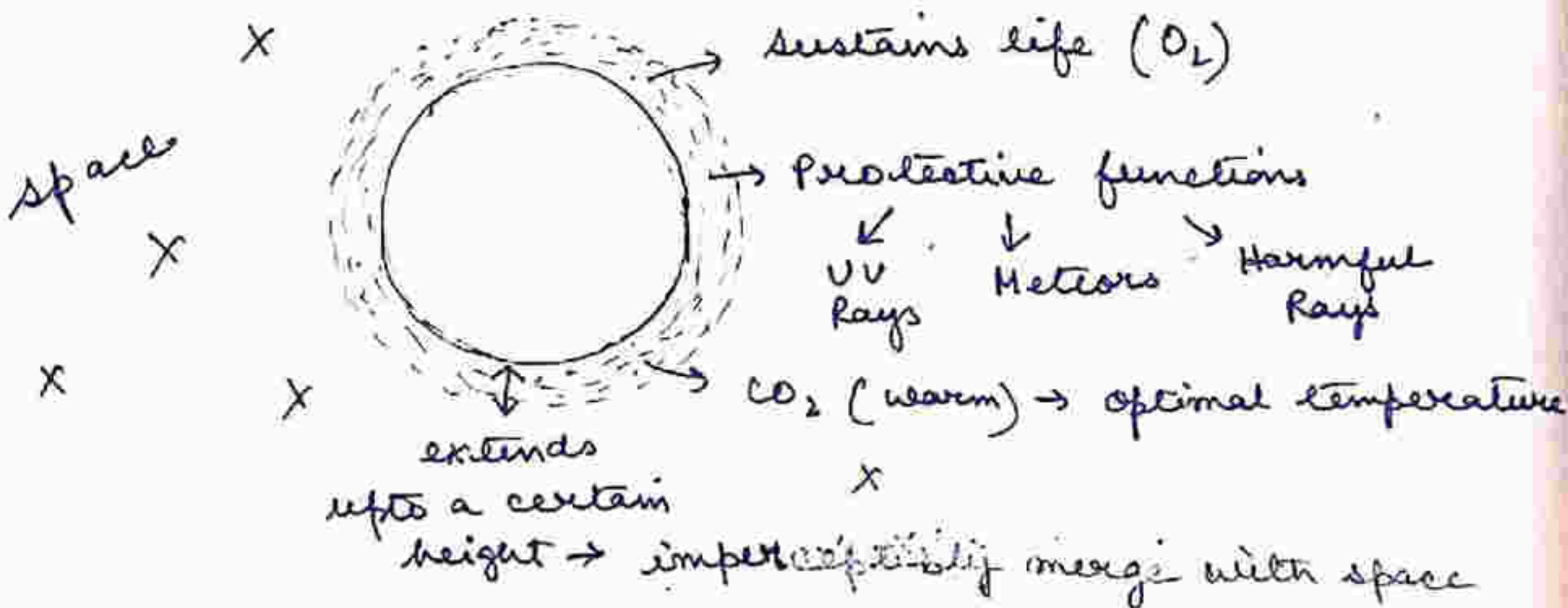
Atlantic ocean: busiest, from commercial view.



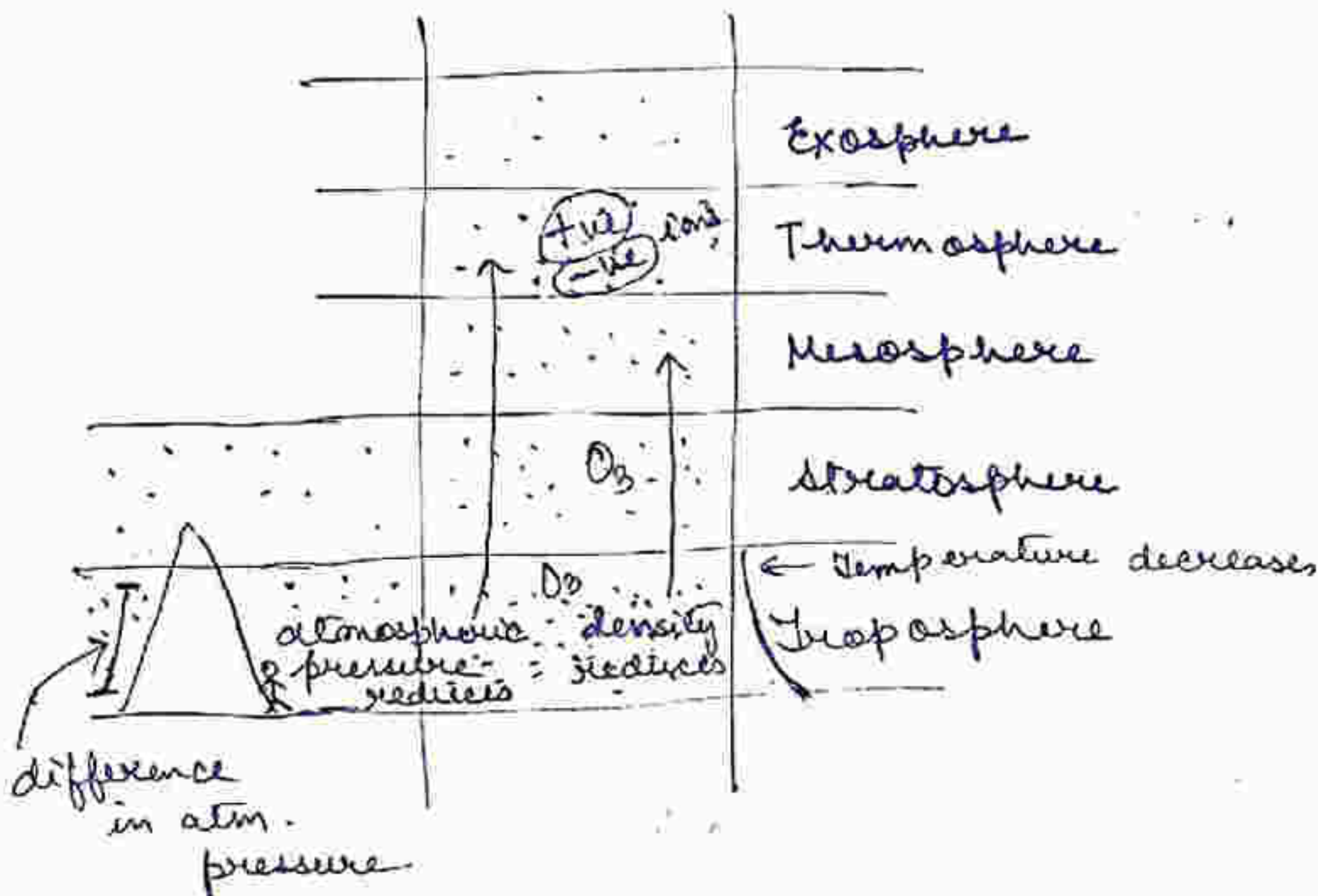
- ⑥ Atlantic Ocean - 'S' shaped  
 Indian " - 'Δ'  
 Pacific " - 'O'



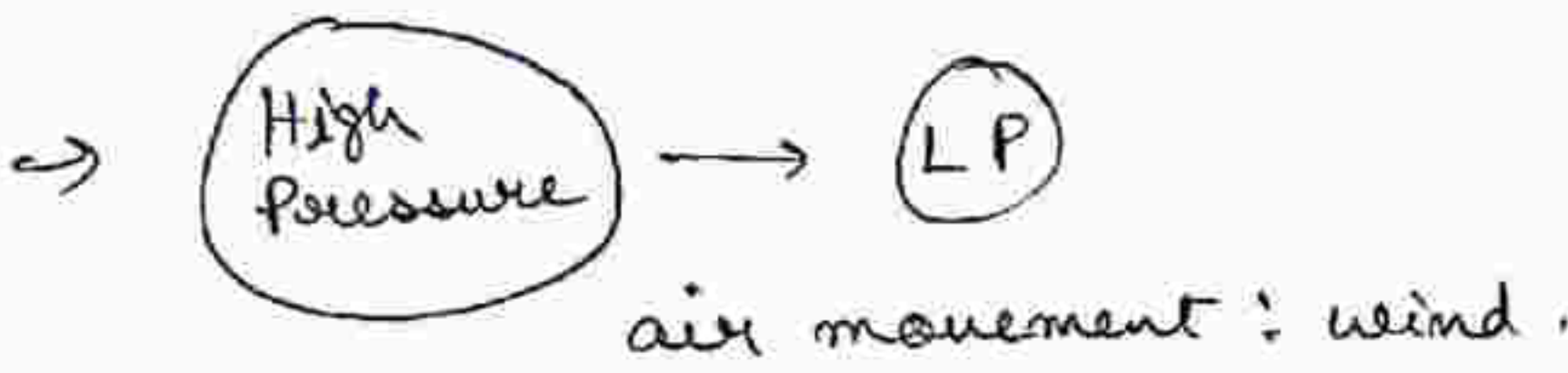
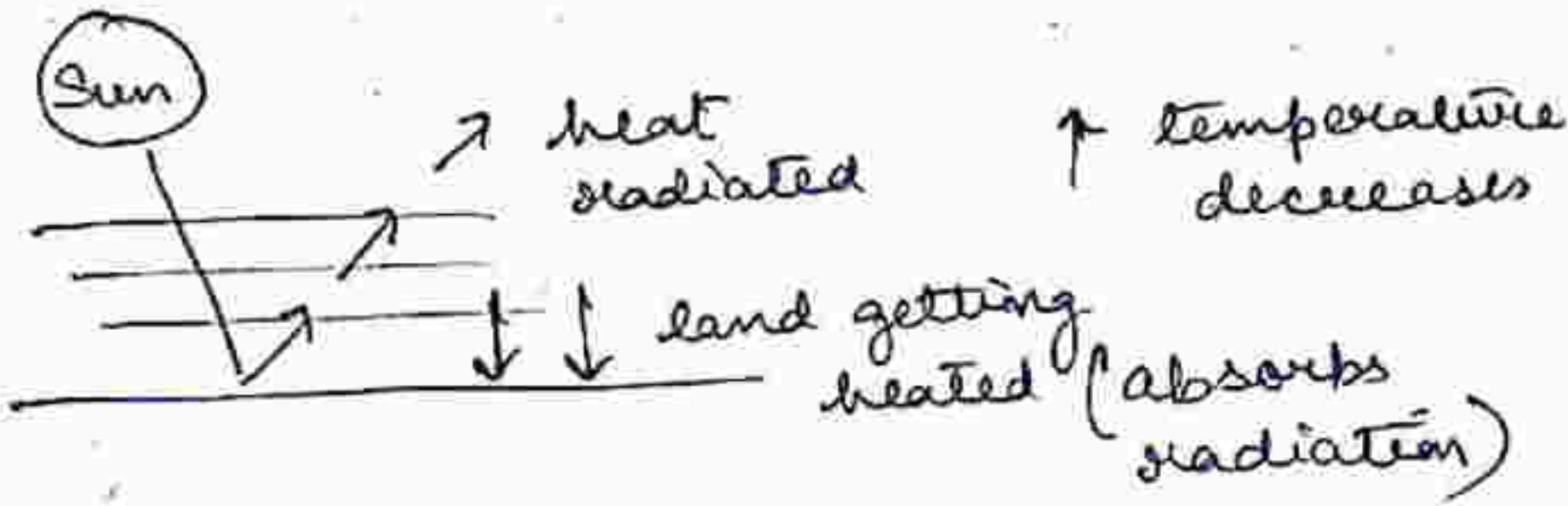
→ Atmosphere ( $N_2, O_2, CO_2, O_3, Argon \dots$ )



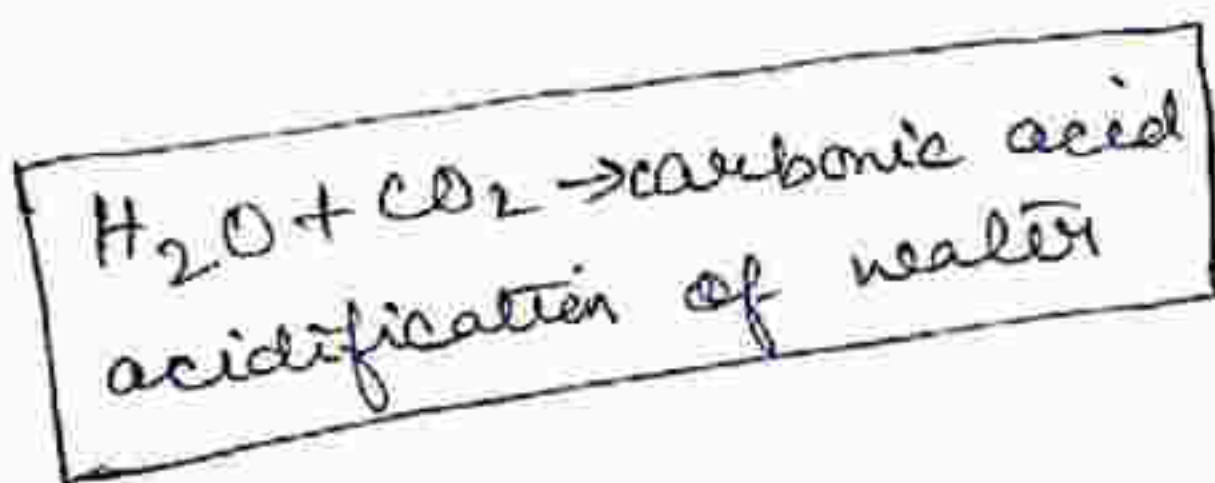
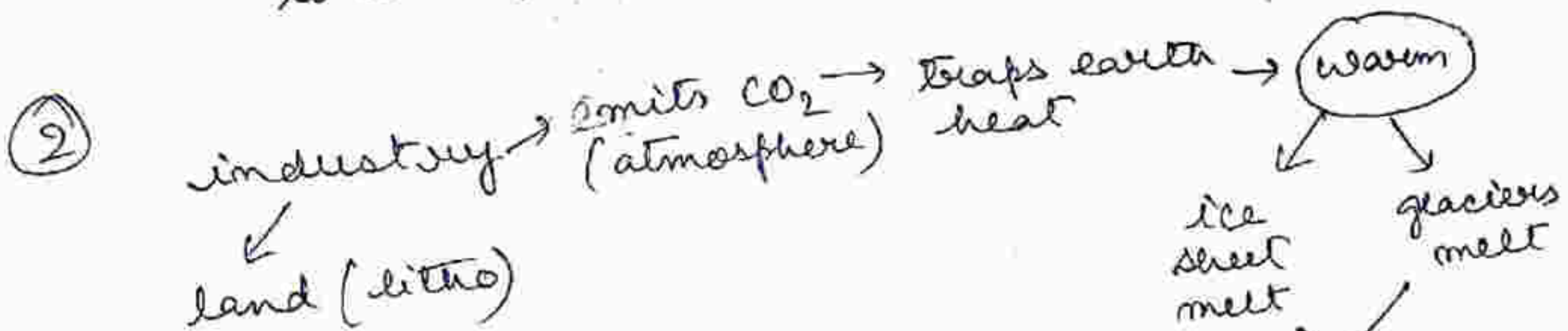
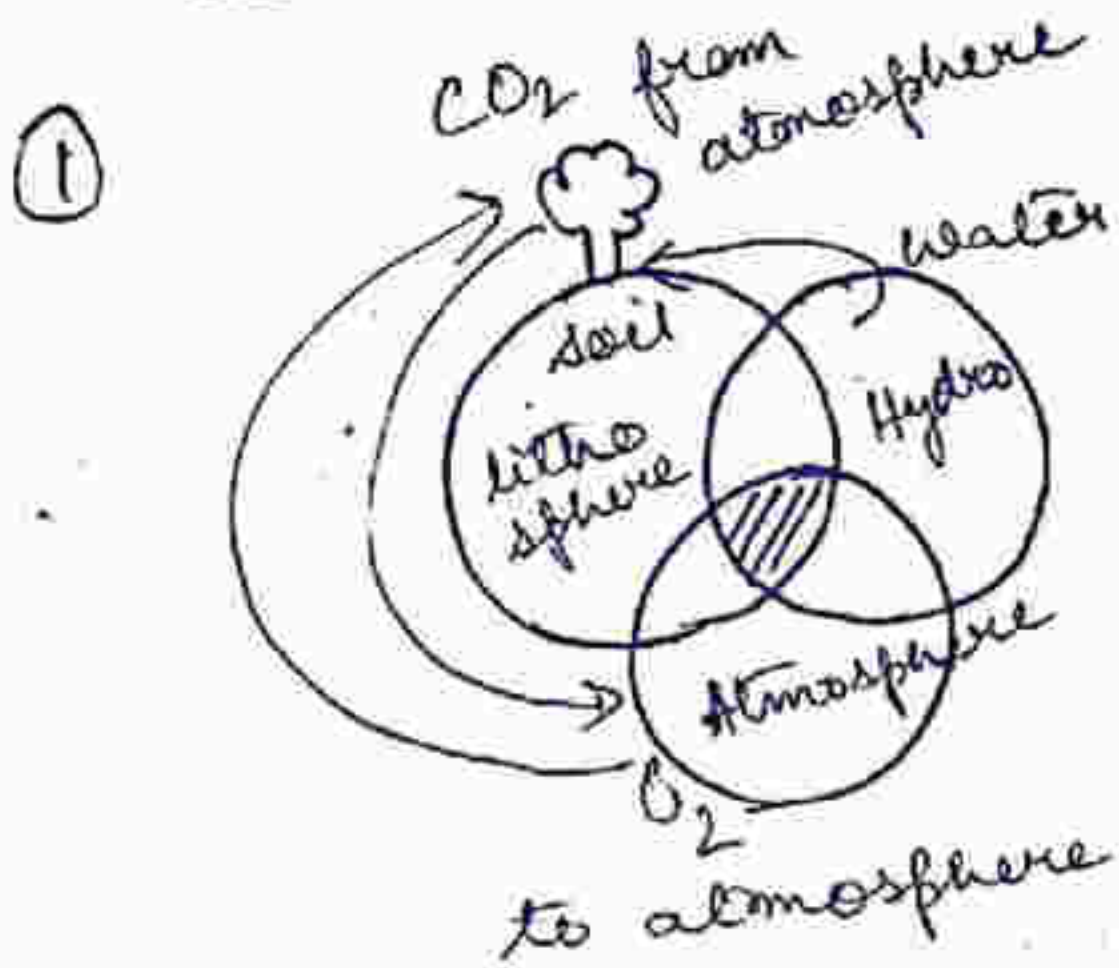
$O_2$  - life  
 $N_2$  - plants  
 $CO_2$  - warm, optimal





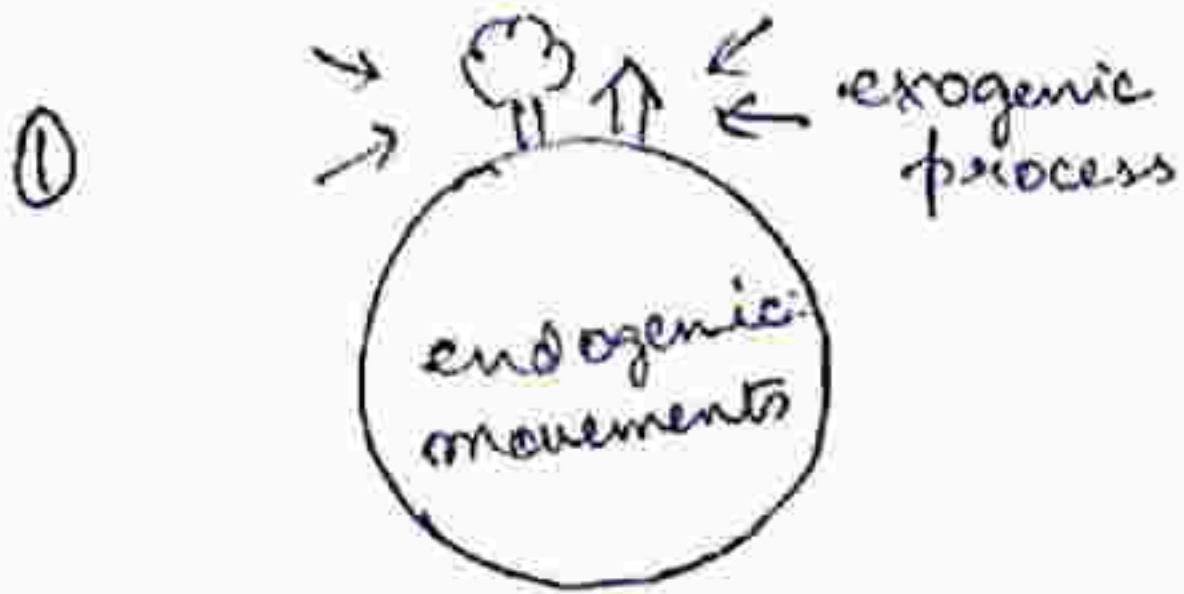


Hydro - Litho - Atmosphere are interlinked

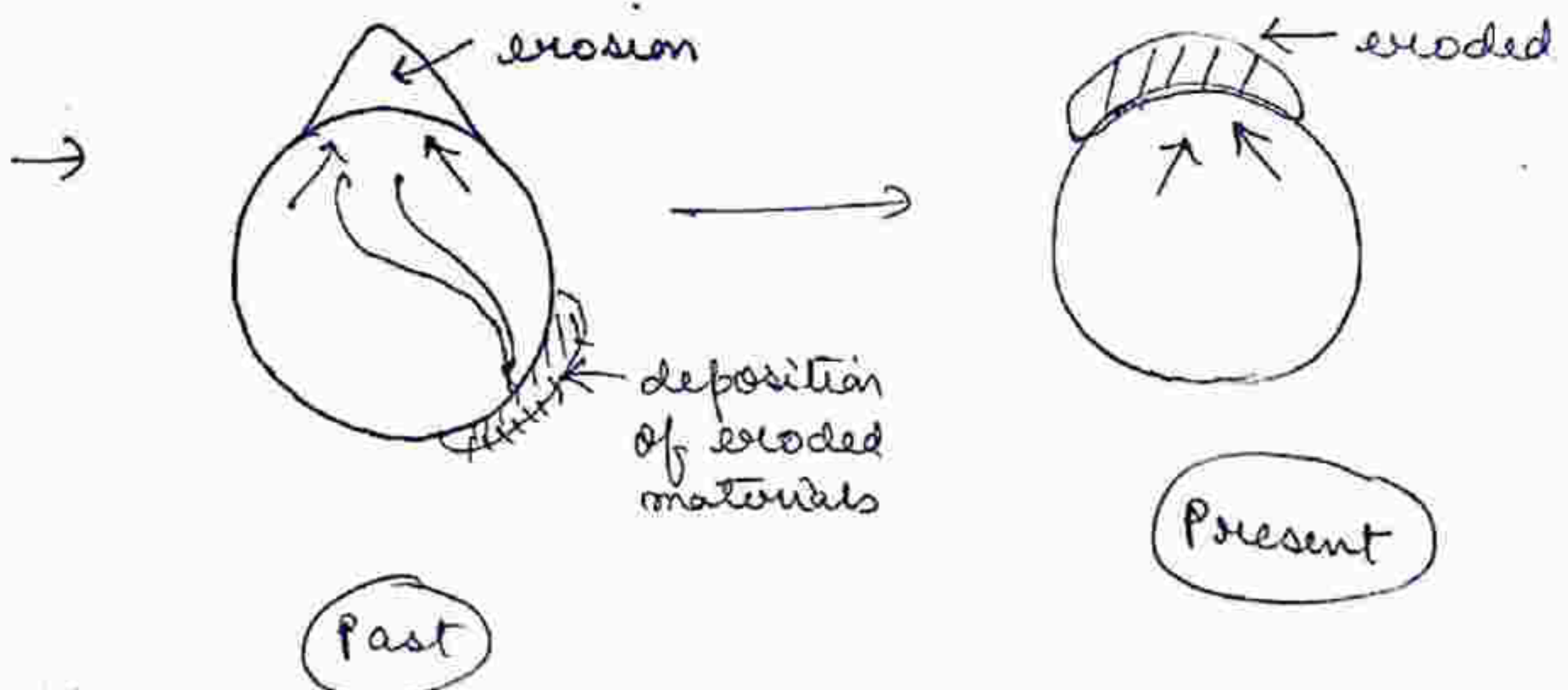
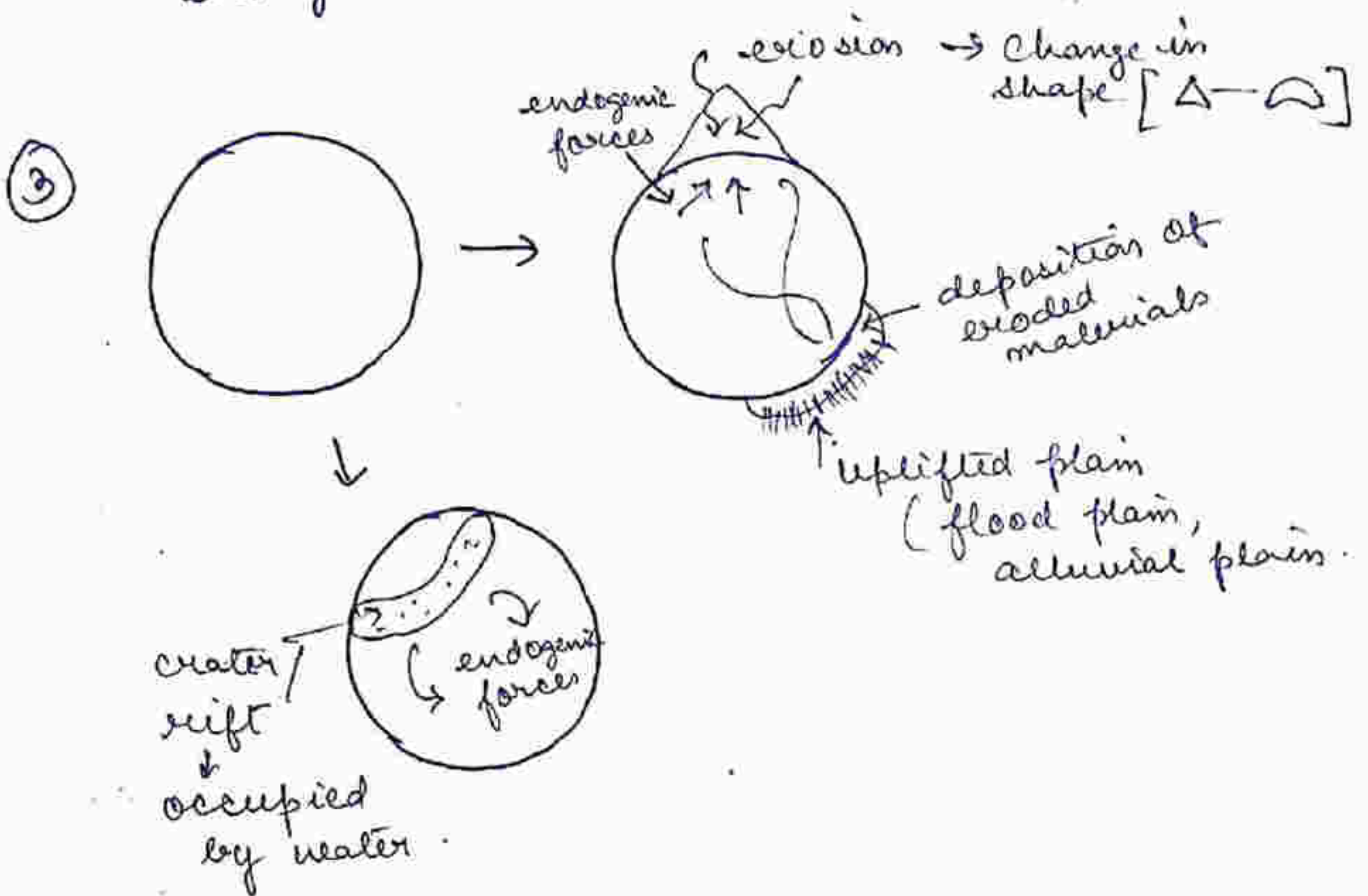




### Major landforms of the earth



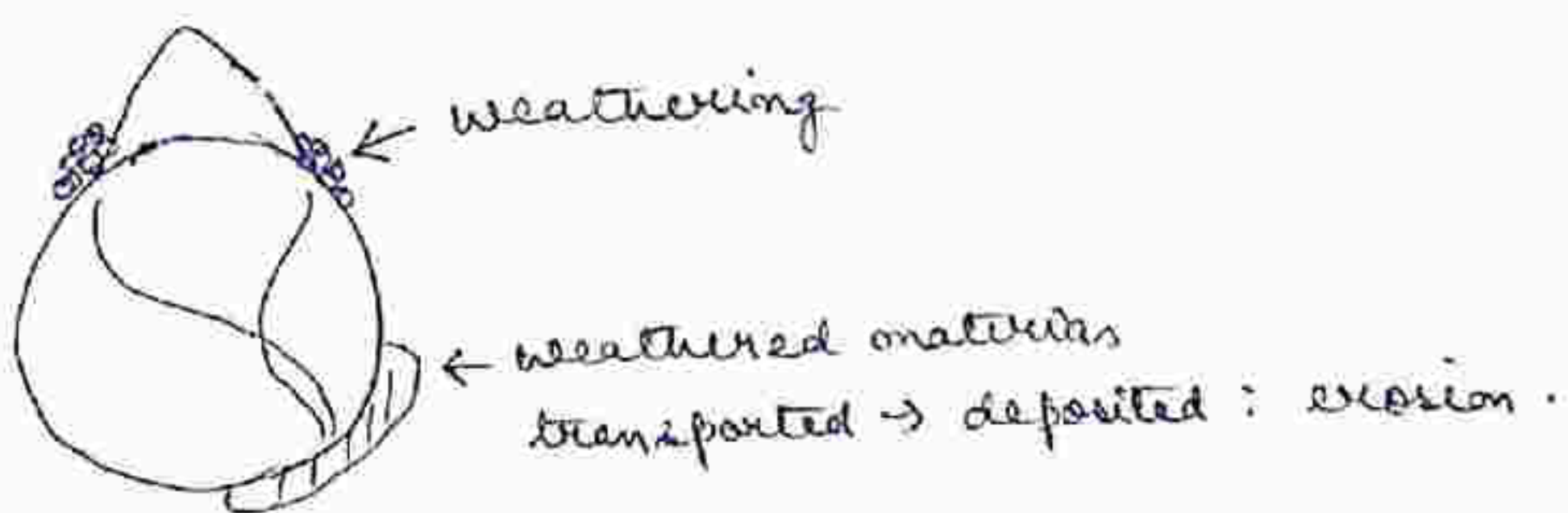
Our body is guided by endogenic as well as exogenic process - saves the body.





- Landforms = endogenic + exogenic processes
- Arcaualti → fold mountain → erosion → reduced height  
(old)
- E. ghats → same.
- more old landmasses → more erosion
- Young mountains: Himalayas (8848 mt → not much exogenic forces worked)
- from seeing an endo/exogenic process working on a landform at present, it can be presumed what forces worked on it at past.
- \* Present is the key to past.

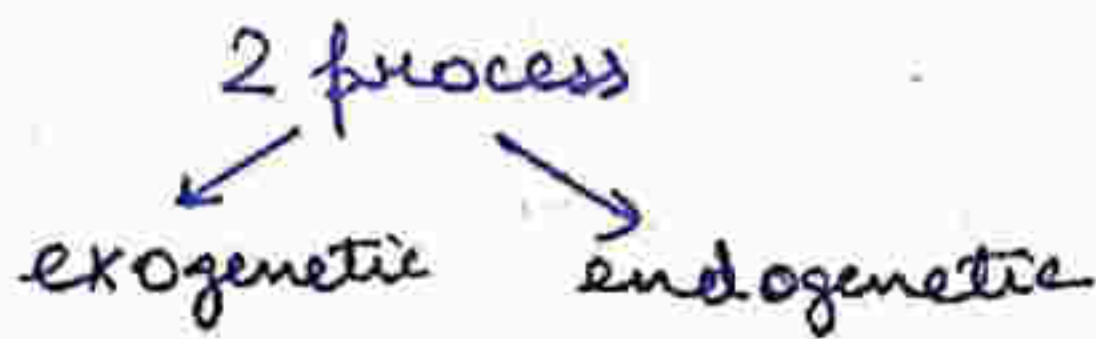
→ Weathering (vs) erosion



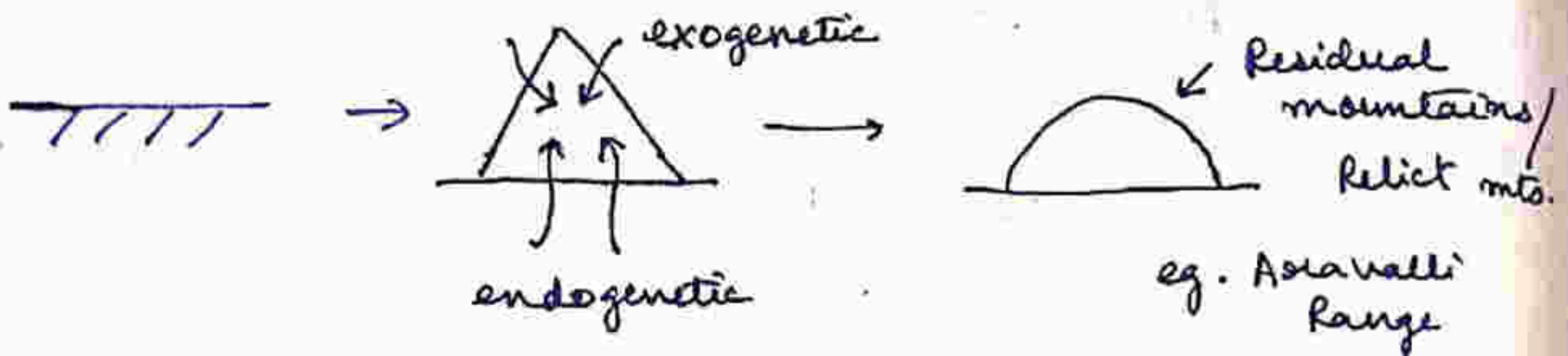
Weathering is a process by which materials like rock, soil, minerals etc are decomposed/broken/ weathered. Here the broken materials are not transported (in situ)

Erosion is the process where weathered materials are transported and deposited.

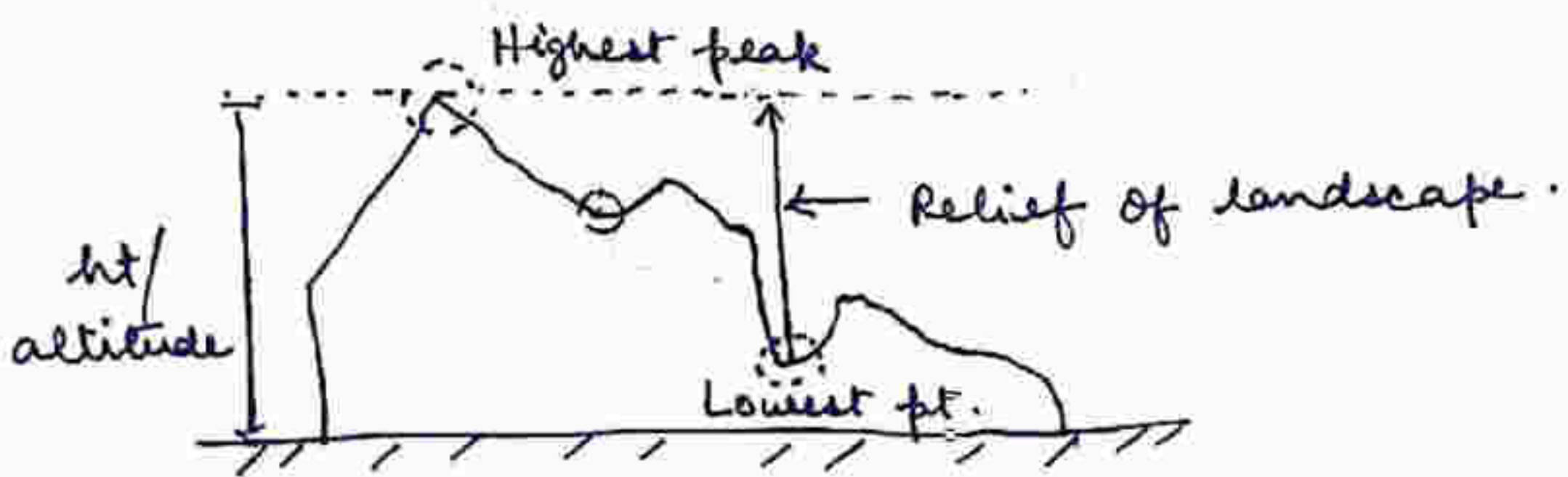




①



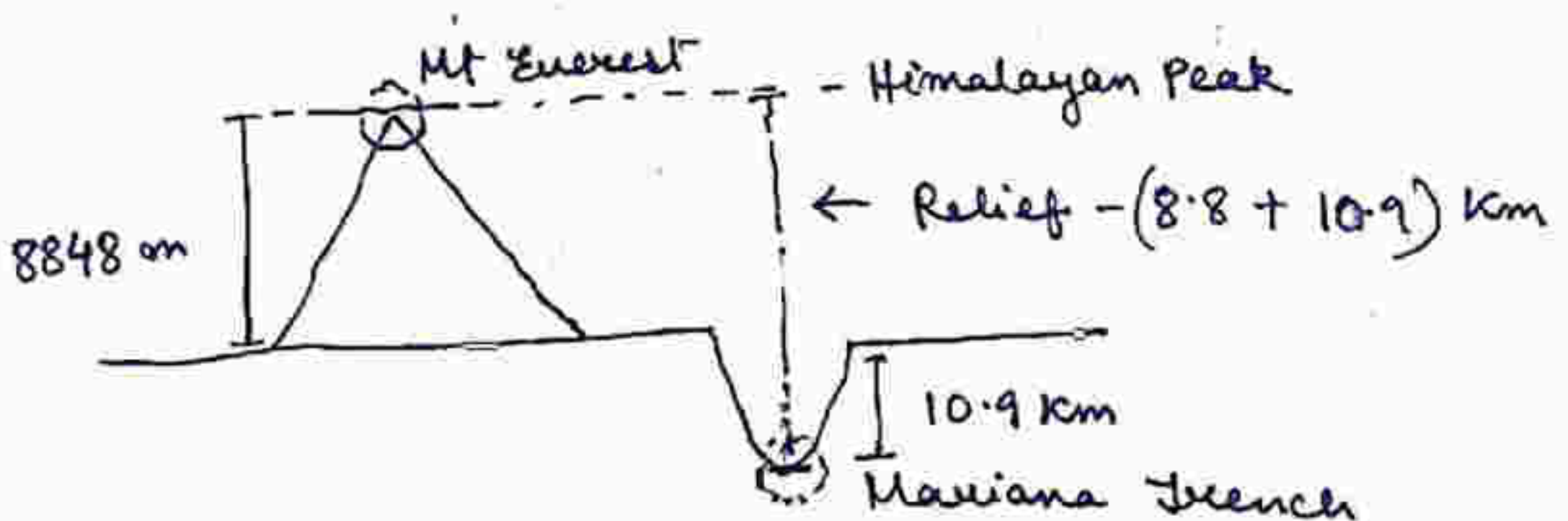
②



Relief refers to the differences in elevation b/w the highs and lows of an area. This difference creates physical features called relief features.

Maximum relief of the earth at present is about 20 Km (i.e. difference b/w Mt. Everest and Mariana Trench)

Relief is different from altitude.

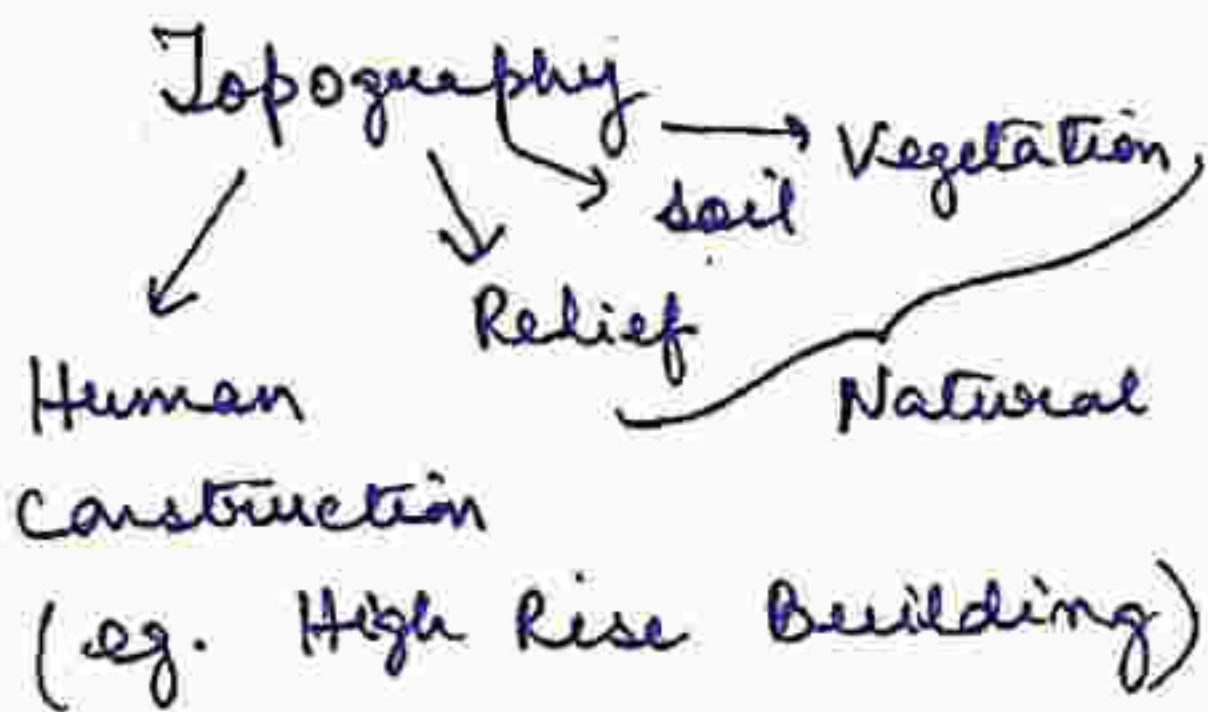


Relief of entire earth



③

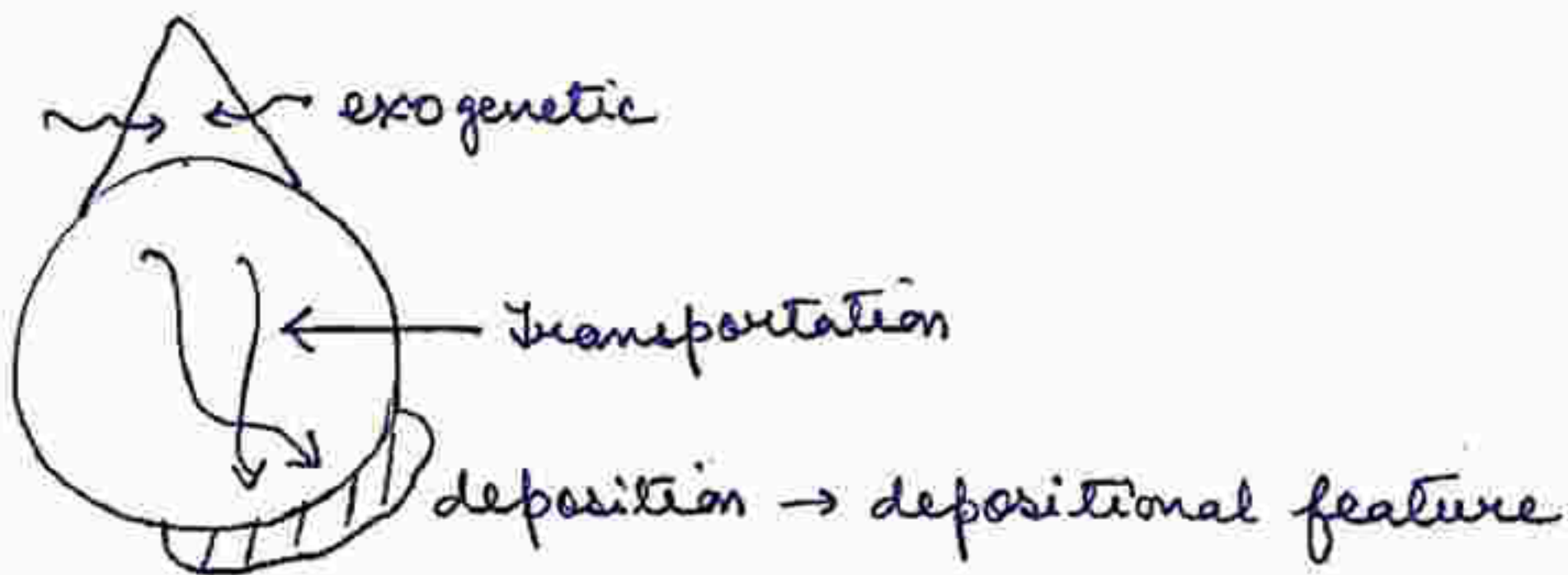
Topography



The term topography refers to surface features of the earth including —

- Relief
- Soil
- Vegetation
- Mankind Creation

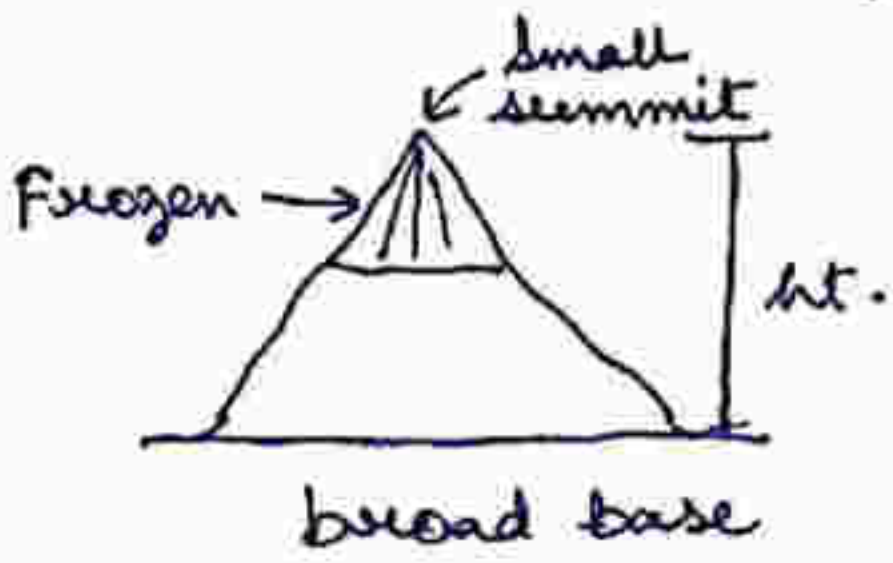
④



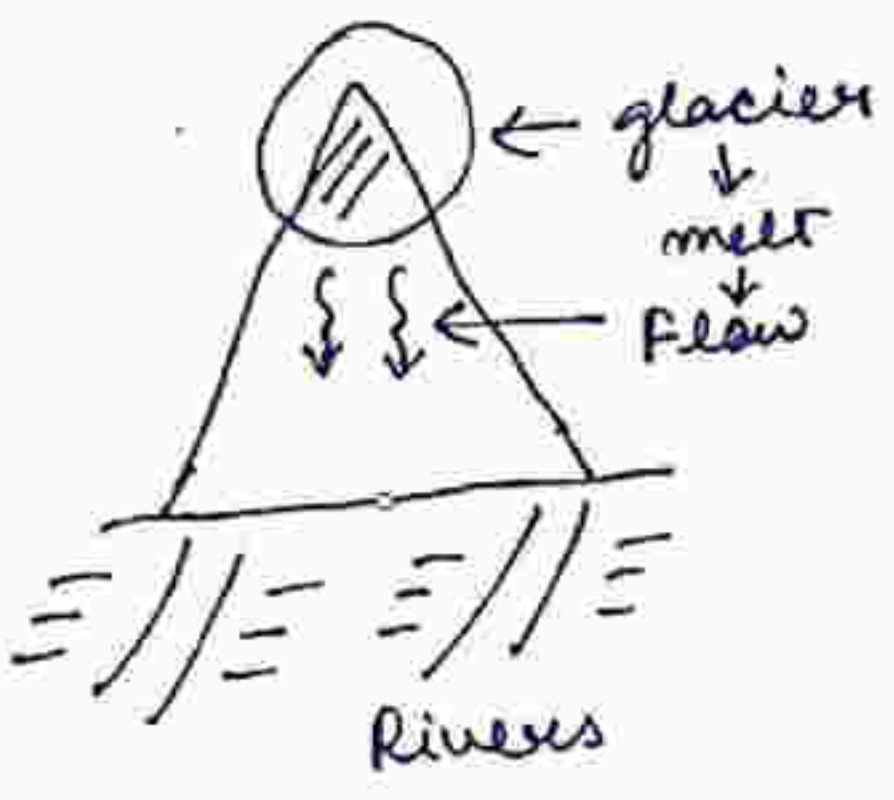


④ (I)

**Mountains**



glaciers (source of water) → Climate changes (warmer) → temperature rises  
 ↓  
 melt glaciers → Flow into rivers



- S. Indian mountain heights → not sufficient to freeze water → glaciers (X)
- N. India → Perennial rivers → glacier water
- S. India → Rainfed  
 ↓  
 Dory → water problem (Kaveri, Maratha region)  
 → Agricultural distress
- Hilly Region - 'Touch and go Tourism' instead of permanent Human settlement


⇒ → **land / plain** ←

↑ ↑ ↑  
 Population pressure → relocate → Mts  
 ↓ → River banks  
 ↓ → Volcanic regions  
 Less sanitation

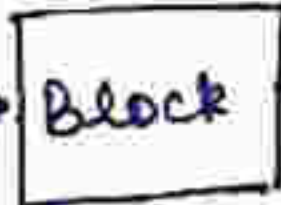
→ Conflicting / competing demand of land:  
 eg. Residence (vs) Highway (vs) Factory → agriculture (less land availability)




Because of conflicting and competing demand for land, people are forced to settle in inhospitable areas (fragile ecosystem) like steep mountains, or river flood plain, volcanic areas, desert regions etc.

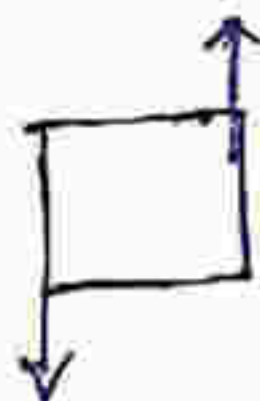
→  → Parallel Range. eg. Himalayas, Alps.

→ 

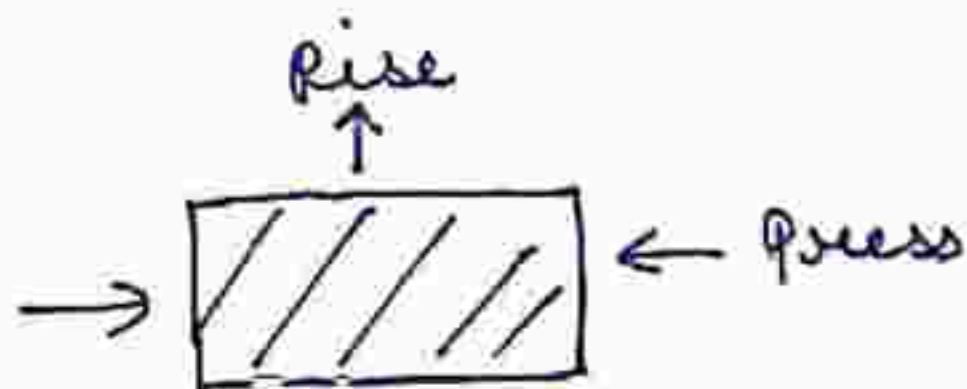
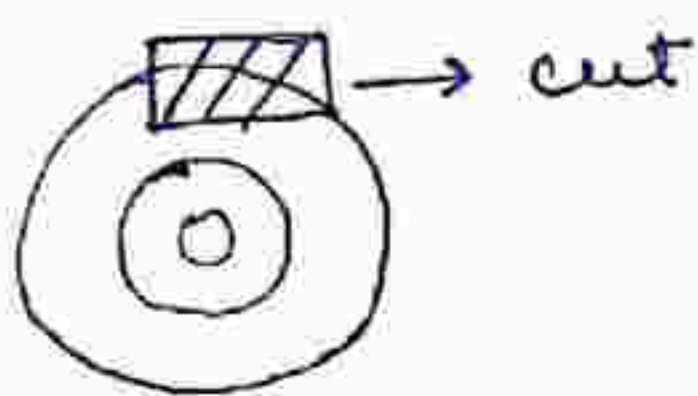
→ Forces: ① Compressive force →  ← Press

② Tensile force ←  → Pull

③ Shearing force (transverse force)  
- no vertical movement



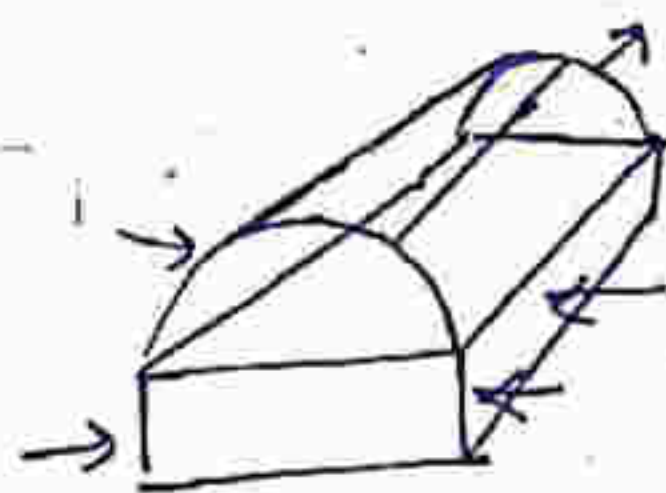
→ ① Fold mountains:



a) Compressive forces

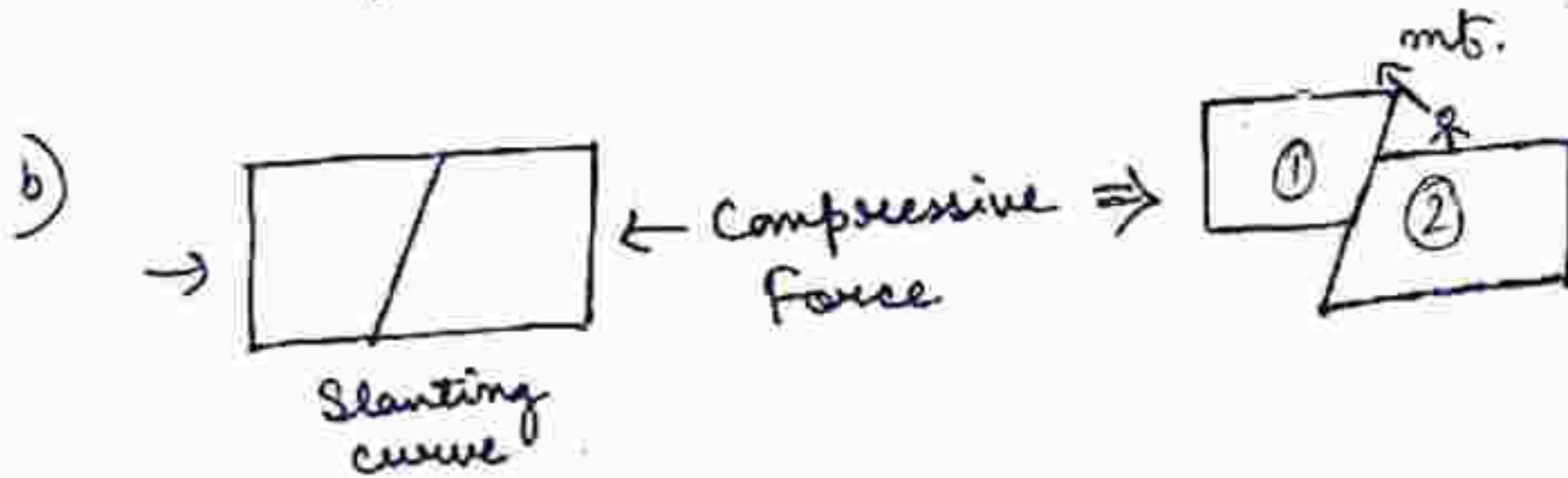
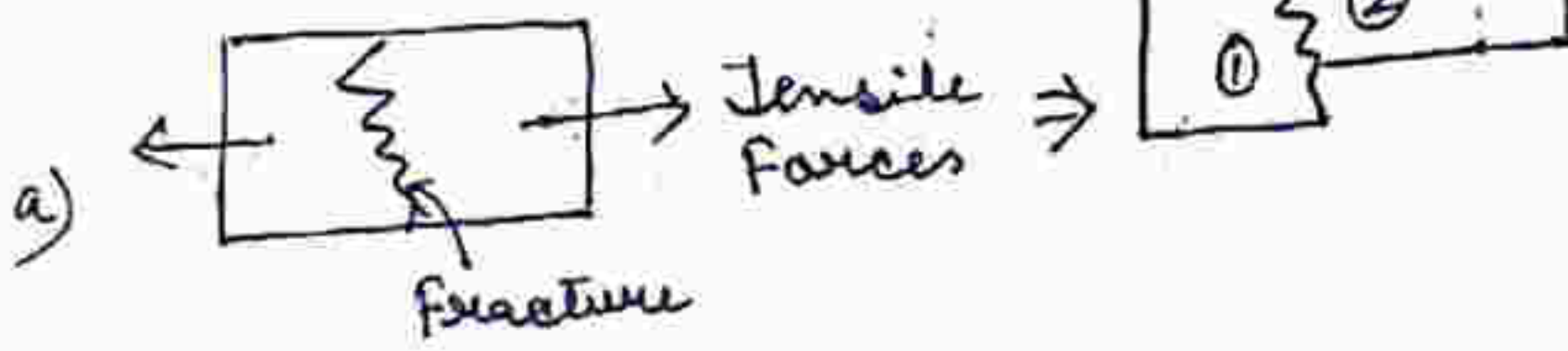
b) Always extensive ranges

c) They are true mountains. eg. Himalayas, Andes, Rockies, Ural

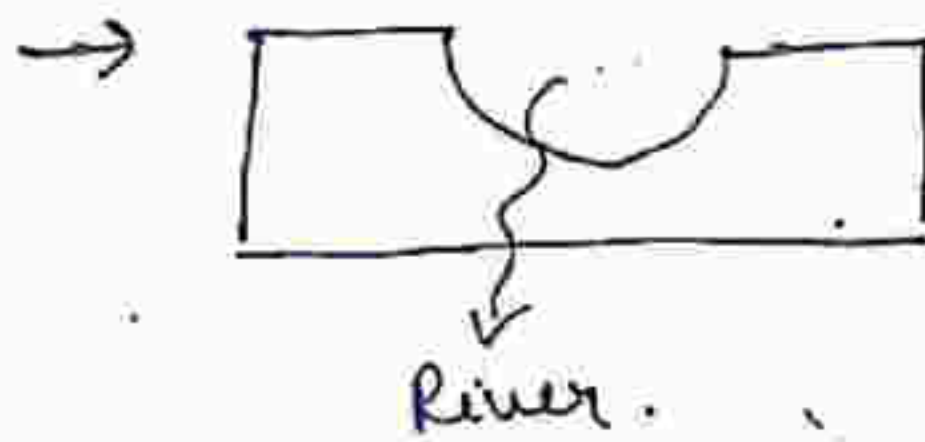
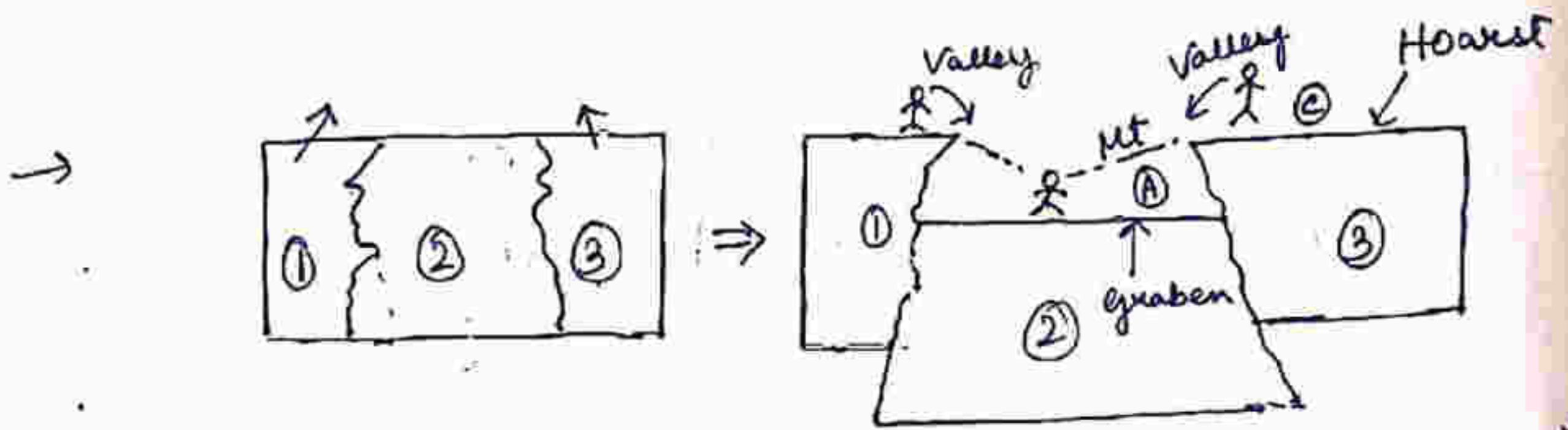




② Block mts.

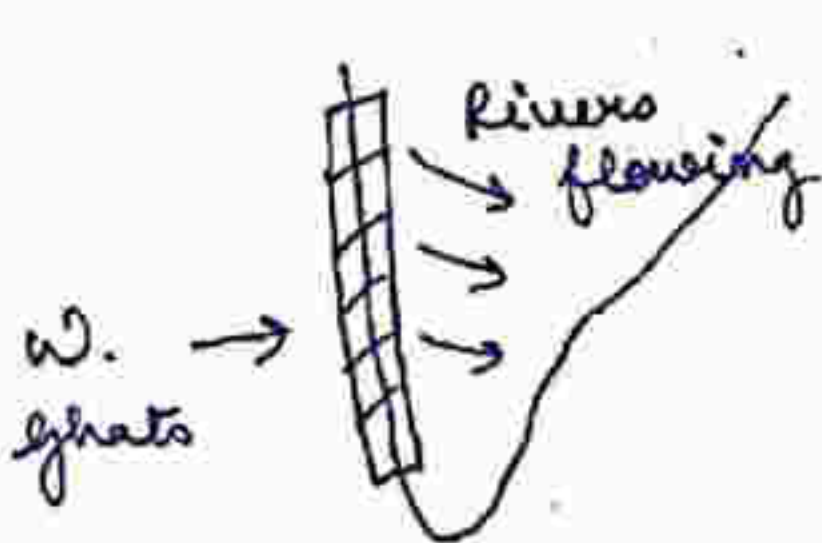


Compressive + Tensional = Block mts.

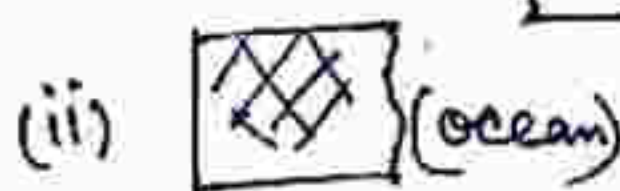


eg: Harz mts, Germany  
W. Ghats.

→ Western Ghats:



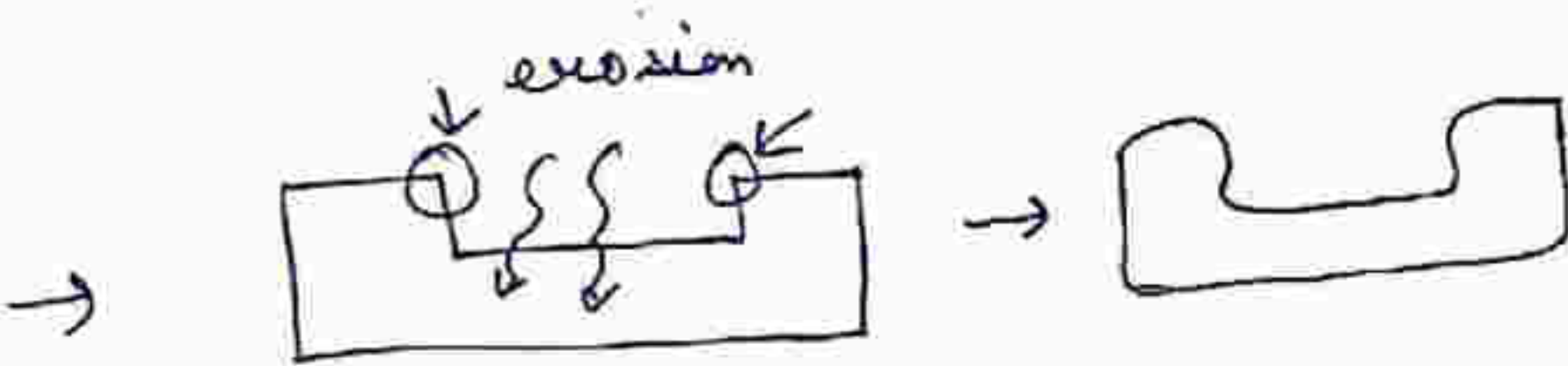
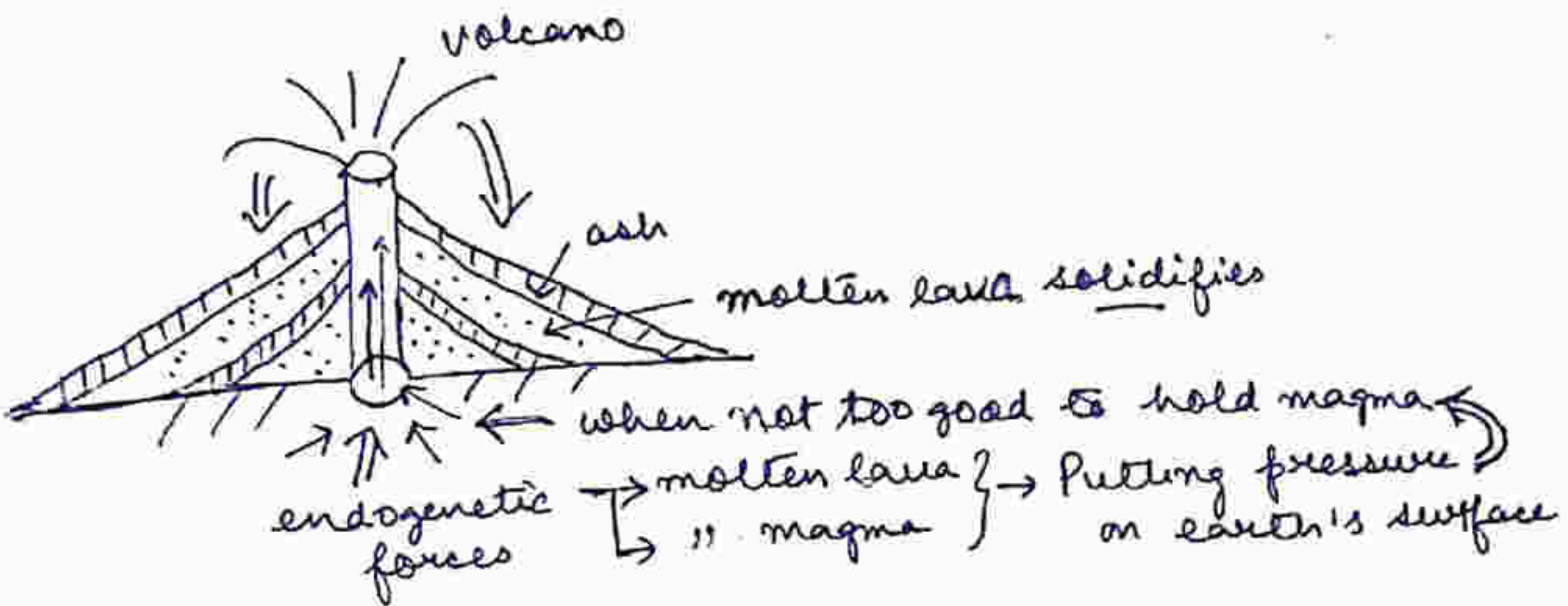
get tilted



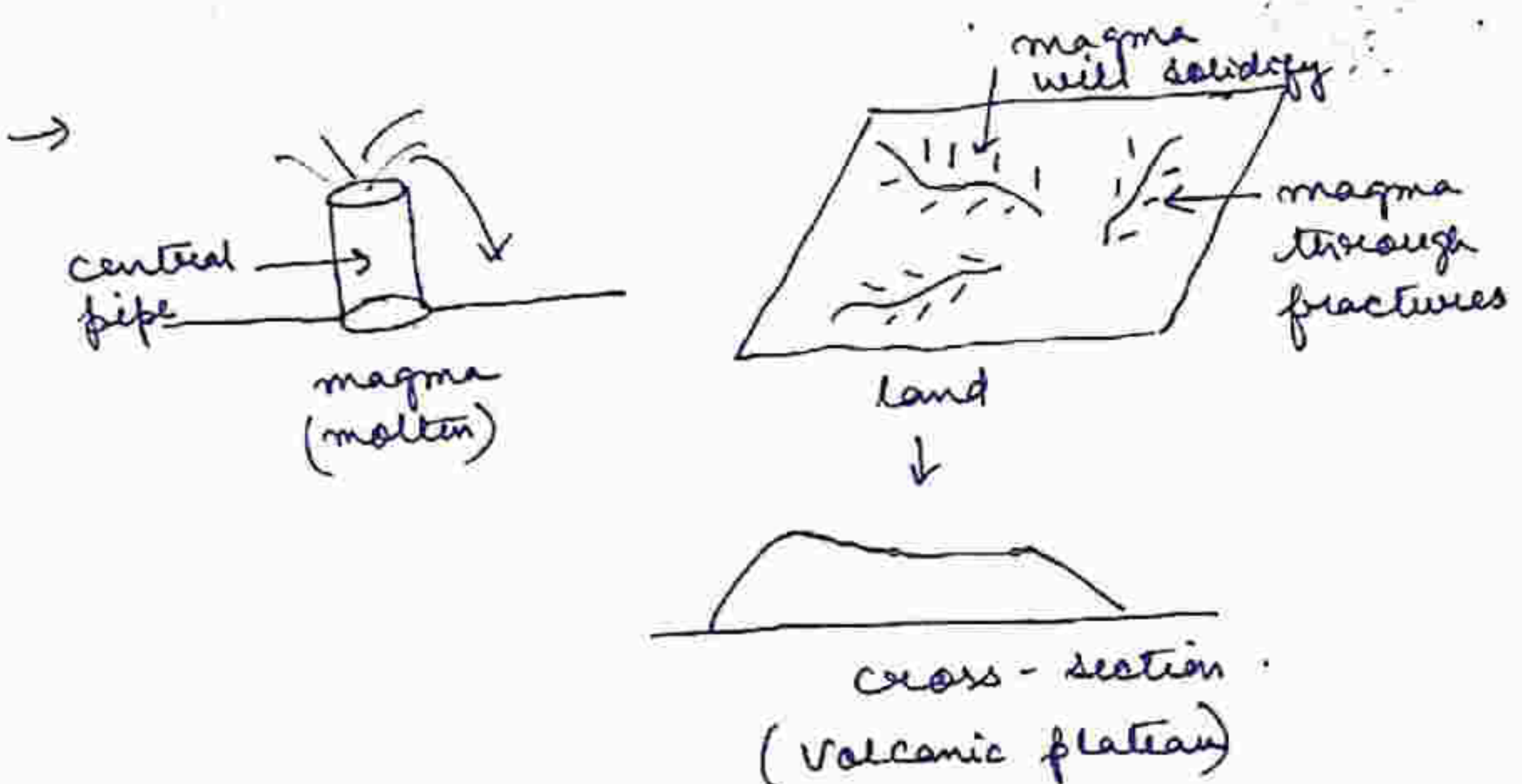
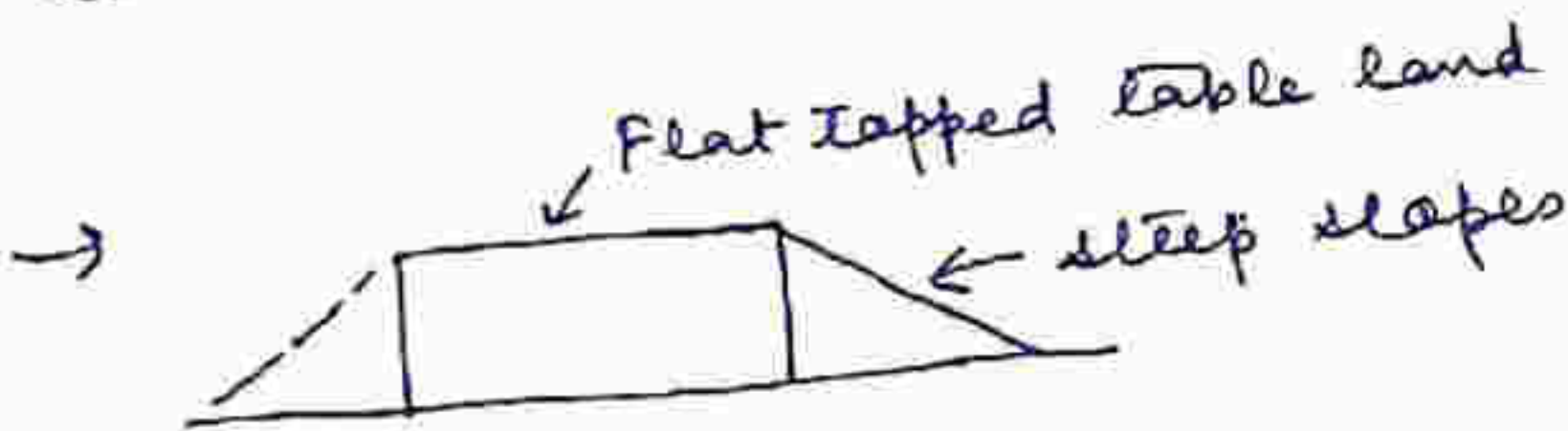
Rivers flowing towards east  
(most Rivers)



③ Volcanic mts :



② Plateaus

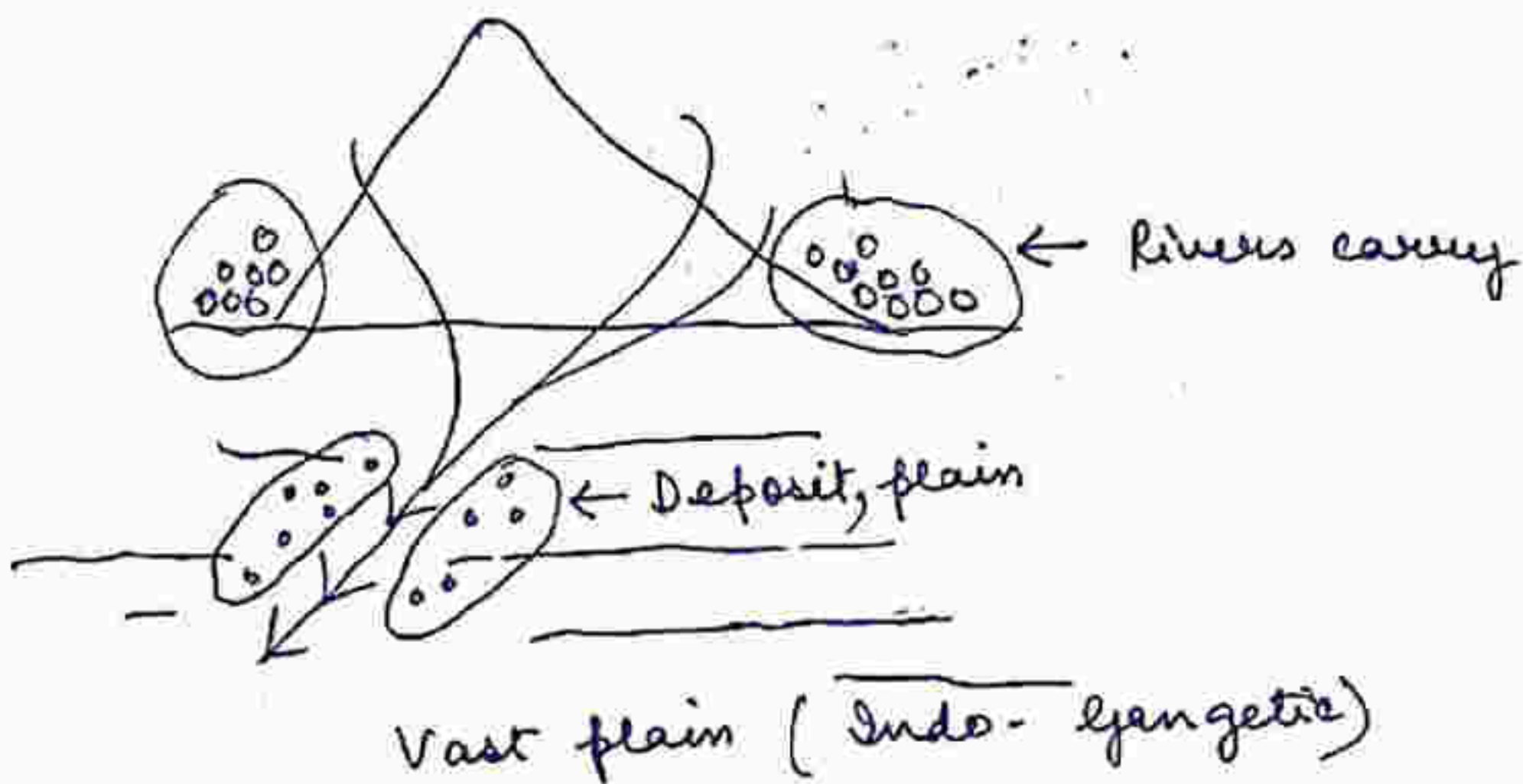




- Old plateau - Deccan Plateau  
Highest " - Tibet "
- Plateaus - Rich in mineral deposits  
Location of many mining areas.
- African plateau : gold / diamond mining  
Chotanagpur plateau : iron, coal, manganese reserves
- Waterfalls : Chotanagpur plateau → Hundru falls  
R. Subarnarekha.  
→ Jog Falls, Karnataka
- Lava plateau : Black soil

III

### Plains



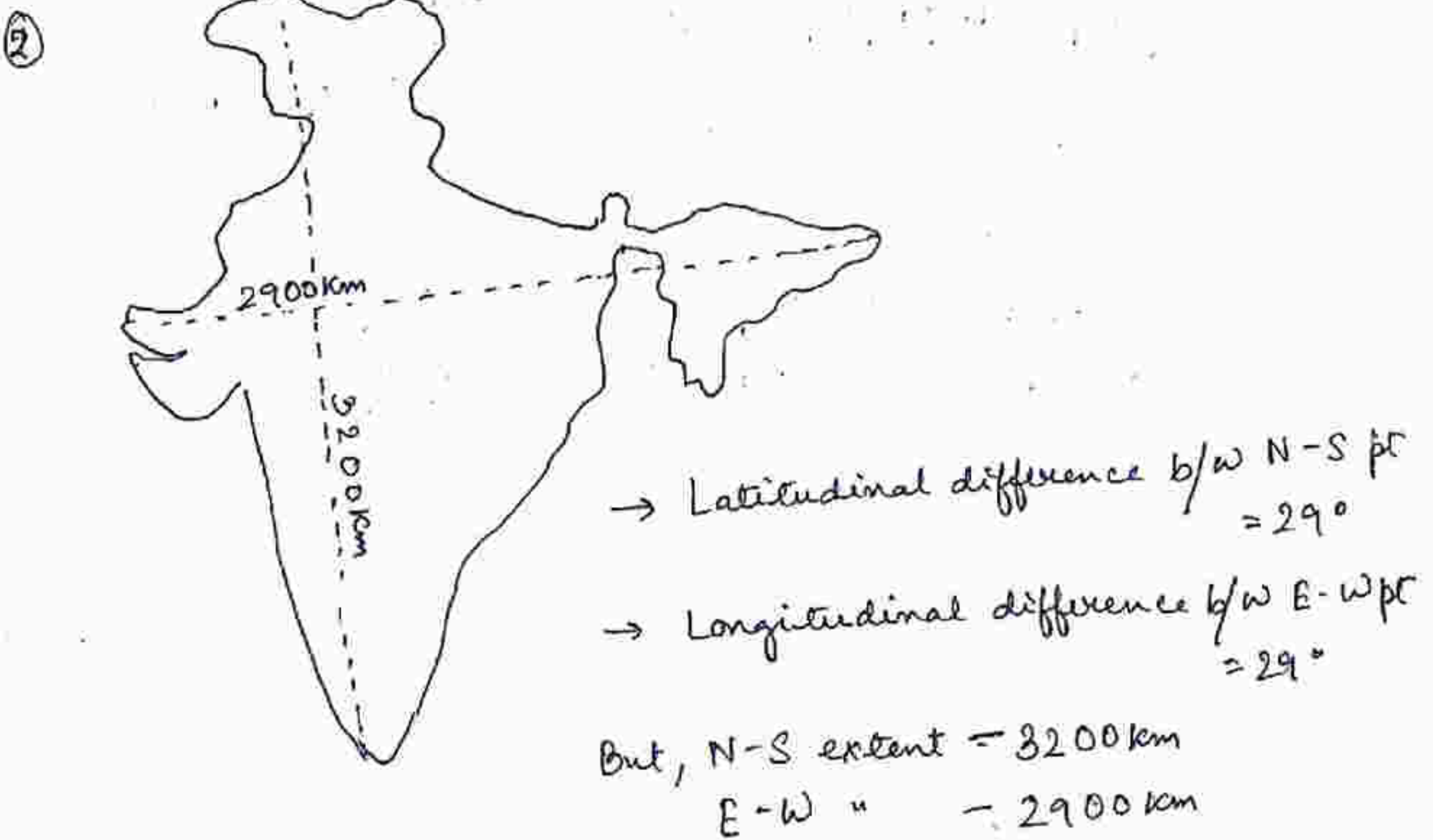
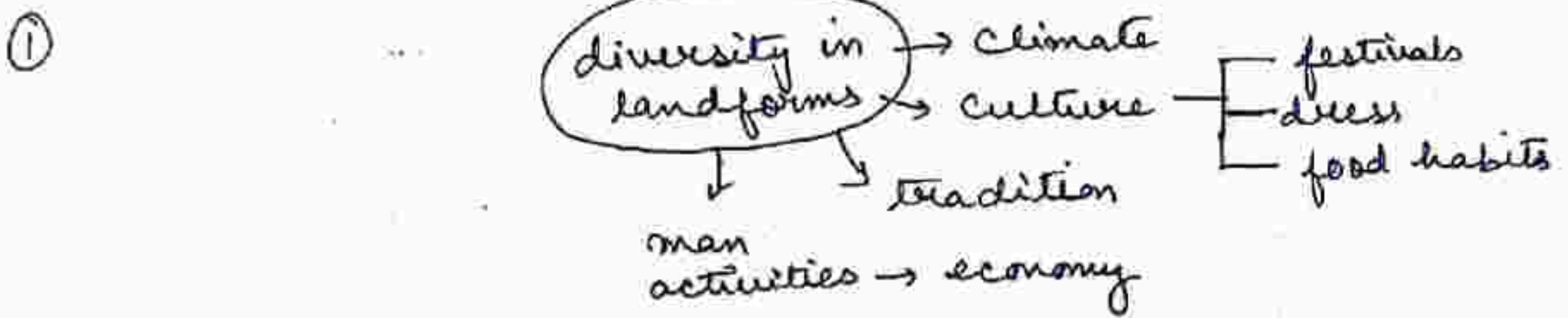
- Human settlement.
  - Transport
  - Factory
  - ↓ Agriculture
  - Residence.

- Sustainable developments : meeting demand of present generation without compromising the ability of future generations to meet their needs.
- Gandhi - Nature has given enough to satisfy our need but not our greed.



### Our Country - India

Q. Diversity in landforms influences diversity in culture, tradition and mankind activities.



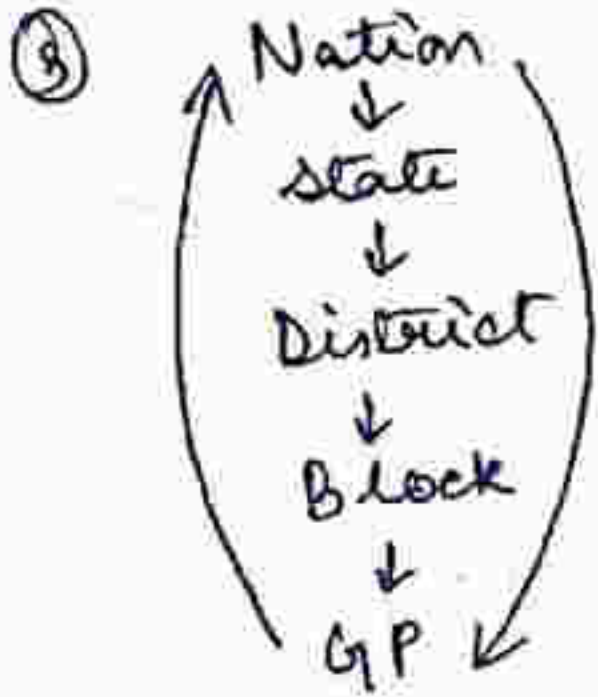
This is because latitudes are parallel and equally spaced and longitudes are not equally spaced, as we move towards pole from equator the gaps b/w two longitudes go on decreasing.

Q → Write in the ascending order the length of borders different neighbouring countries share with India.

Afganistan < Bhutan < Myanmar  
< Nepal < Pak < China  
< Bangladesh.







← Such division is because of

- administrative convenience
- other issues + language
- + culture
- + regionalism

→ people also can vent out their feelings in demand of a new region.

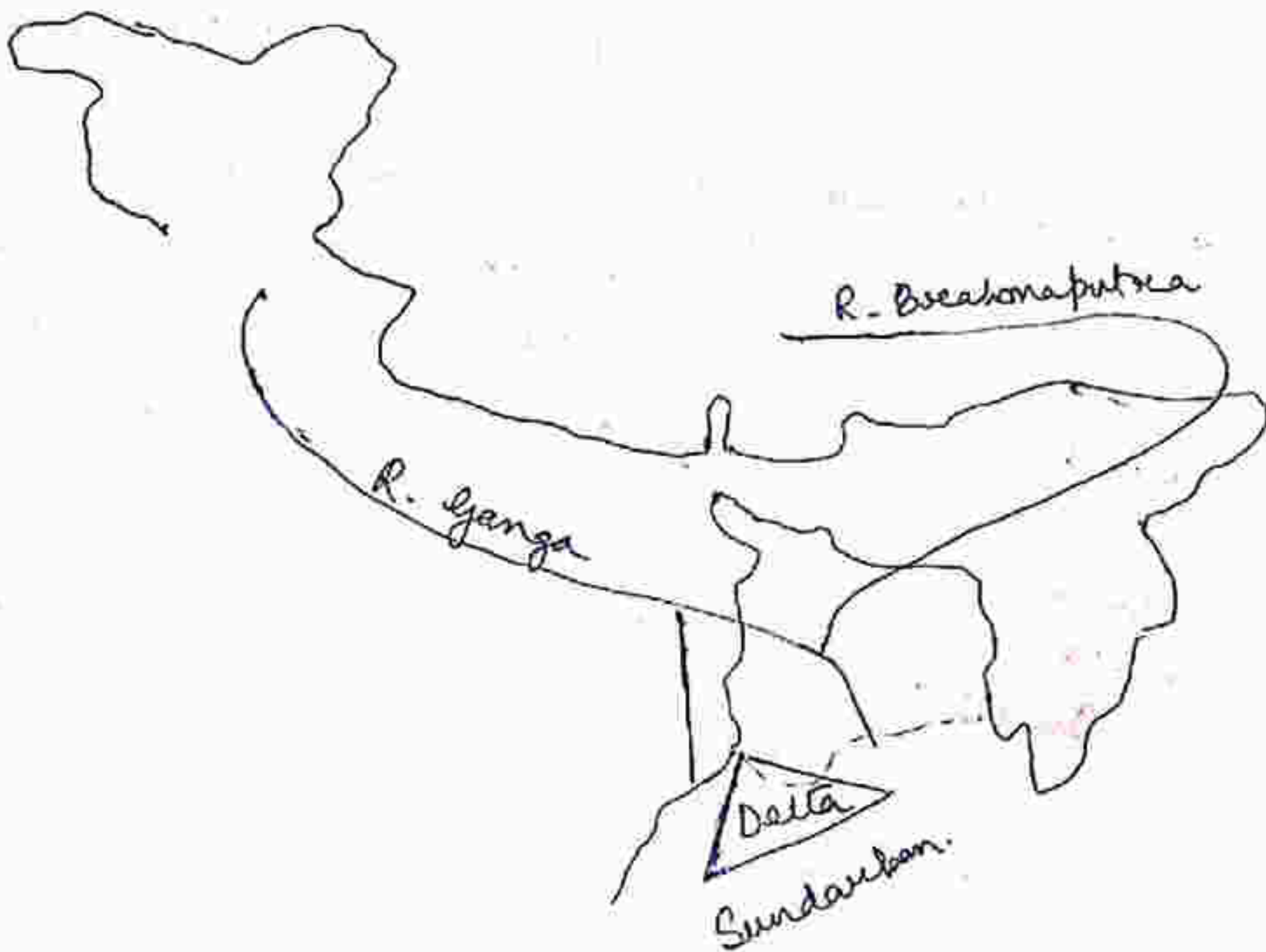
eg - group of Naga people → Nagaland + Assam + AP + Manipur  
 ↓  
 demand for Greater Nagaland

Similarly, Jharkhand.

$S_1 \rightarrow$  abuse  $\leftarrow S_2$  : fracture in society

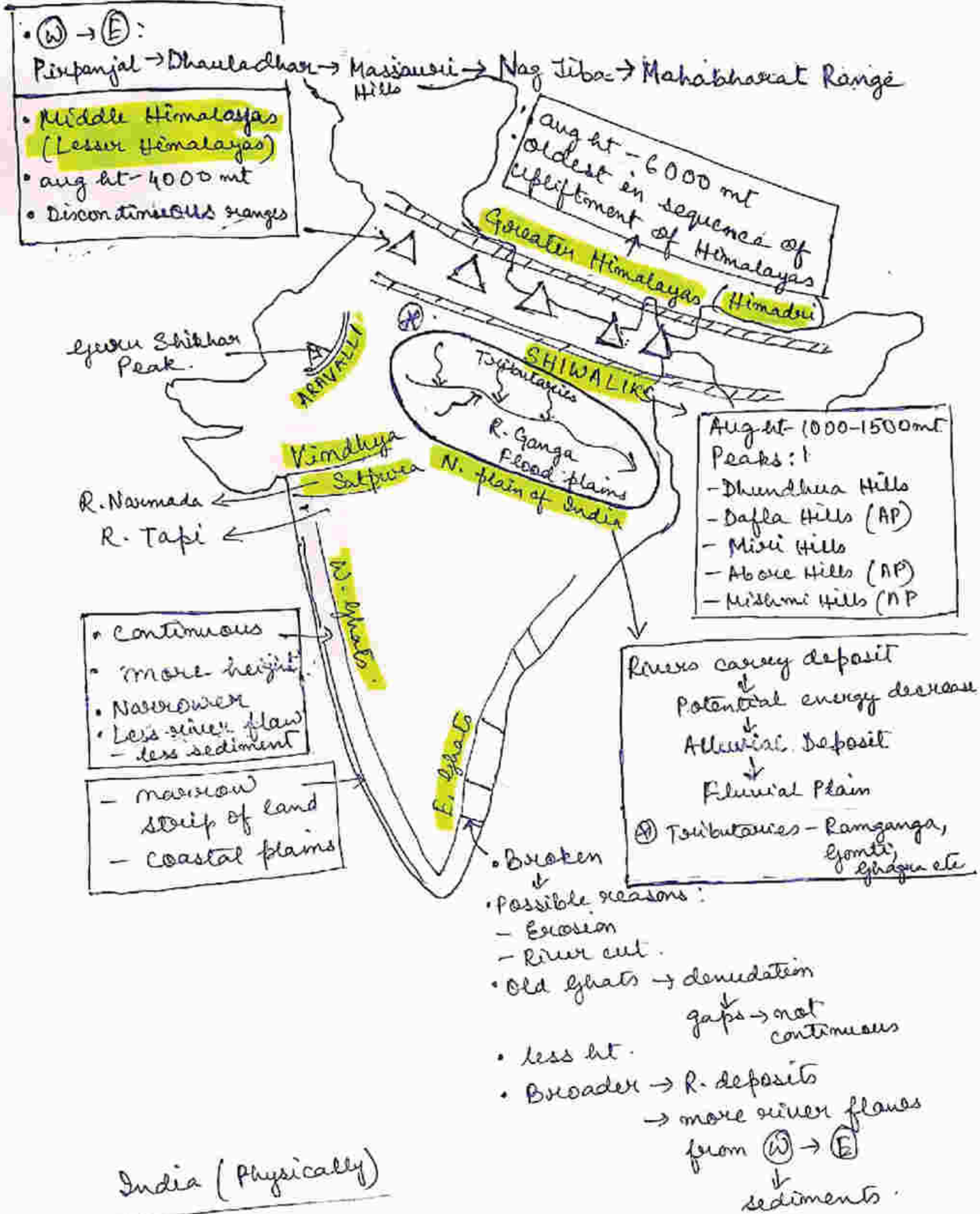
$S_1 \rightarrow$  respect  $\leftarrow S_2$  : National integrity

→ ② Delta -  $\Delta$  landform made by deposition of silt at mouth. eg. Sundarban delta





①



India (Physically)

- ① Mountains
- ② Plains
- ③ Peninsula

→ Islands: Lakshadweep - Coral Islands  
A/N → Nany - China ← Check, Close to M. Strait



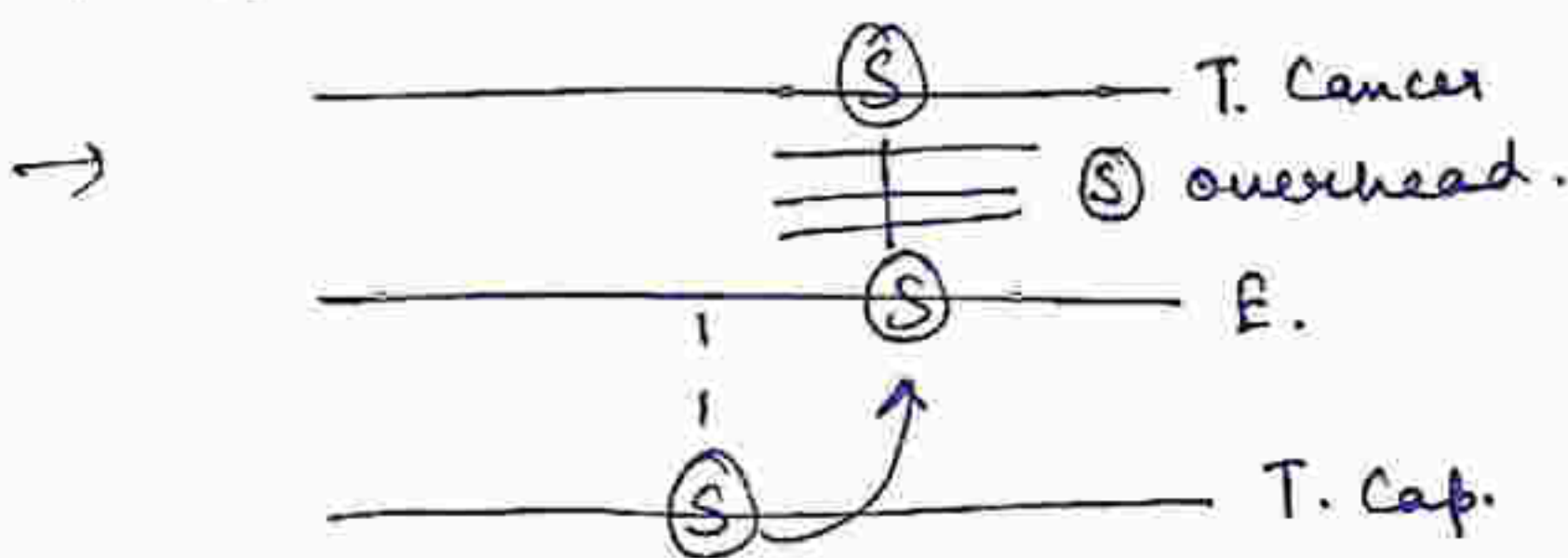
## India: CLIMATE, VEGETATION, WILDLIFE - Ch 8

① Weather - day to day change → Temperature  
→ Sunshine  
→ Rainfall etc

② Climate - avg. weather condition, measured over many years.

India - monsoon type of climate

Factors  
| altitude  
| distance from sea  
| relief  
| location



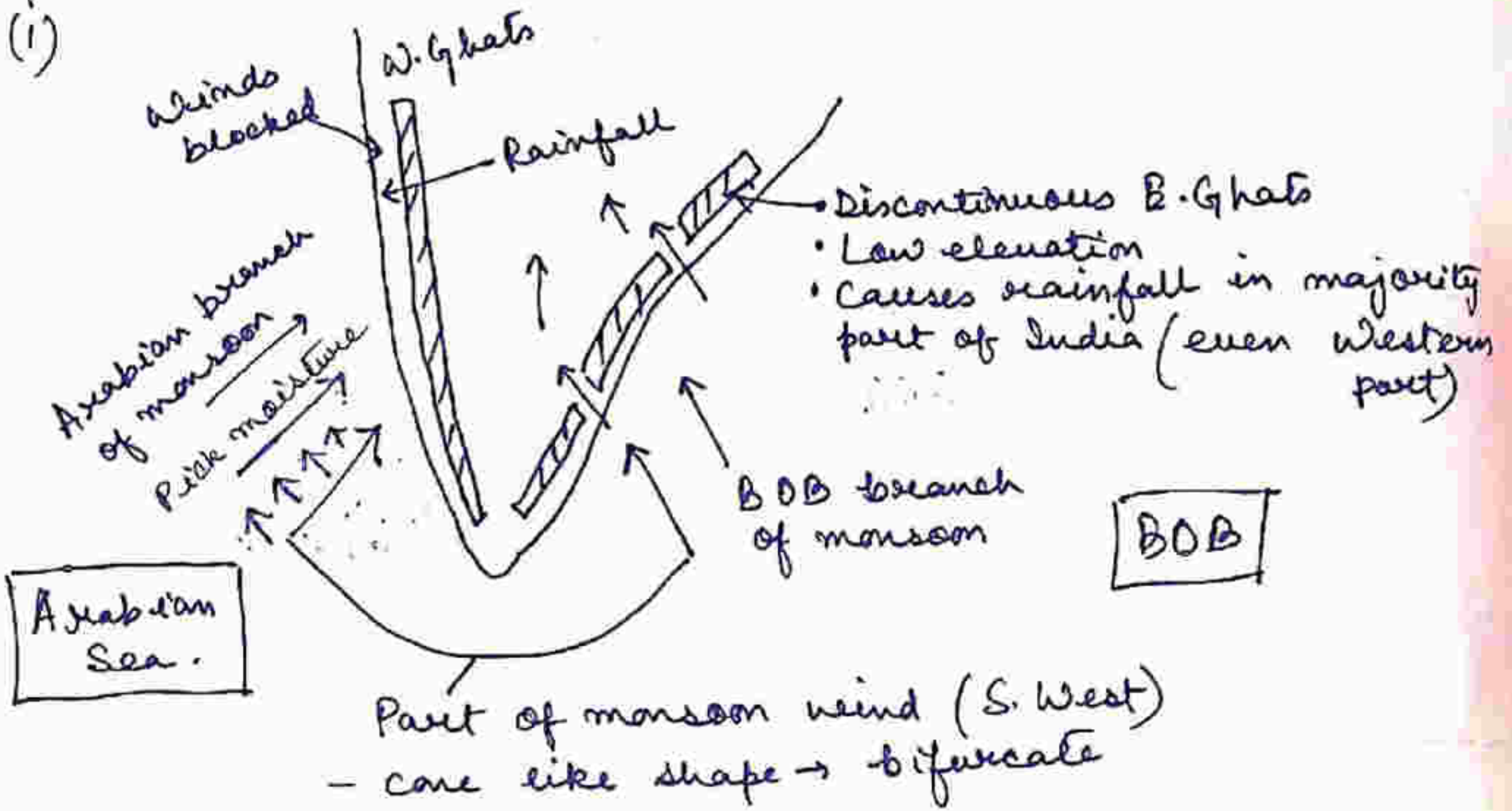
③ Major seasons in India:

- Winter (Dec - Feb)
- Summer (March - May)
- SW monsoon (June - Sept)
- Retreating monsoon (Oct, Nov)

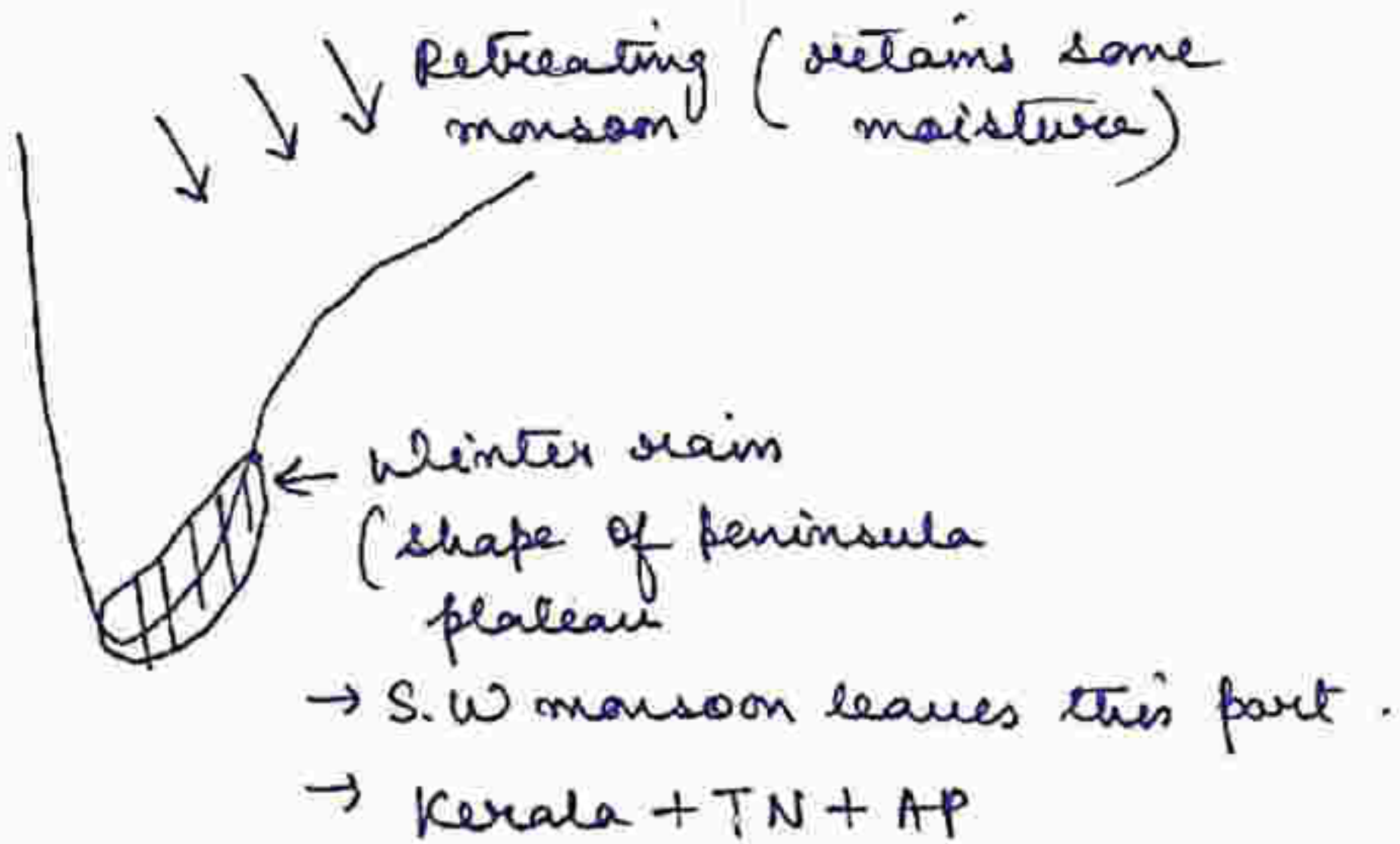


(4)

(i)



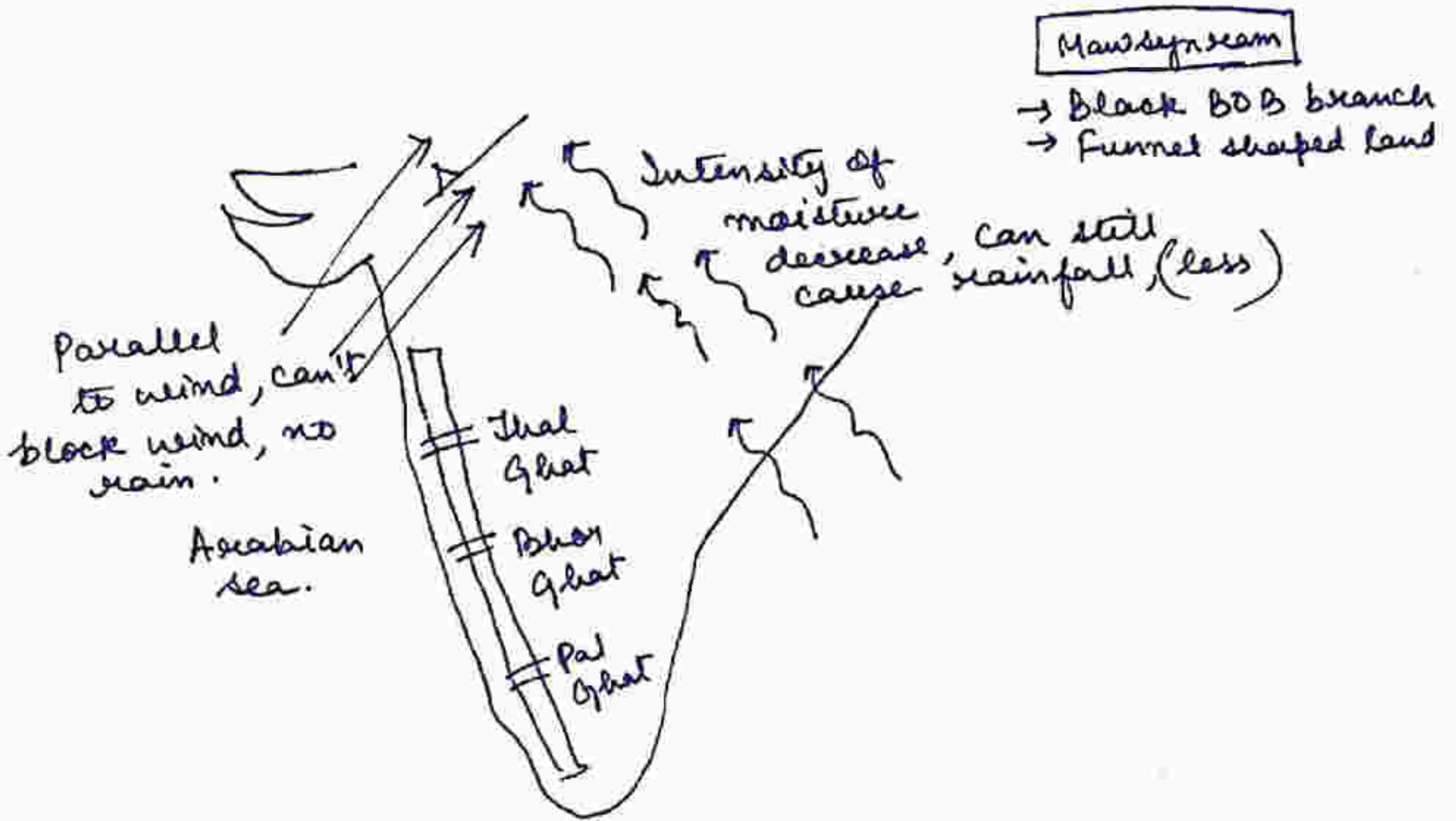
(ii)



Retreating monsoon

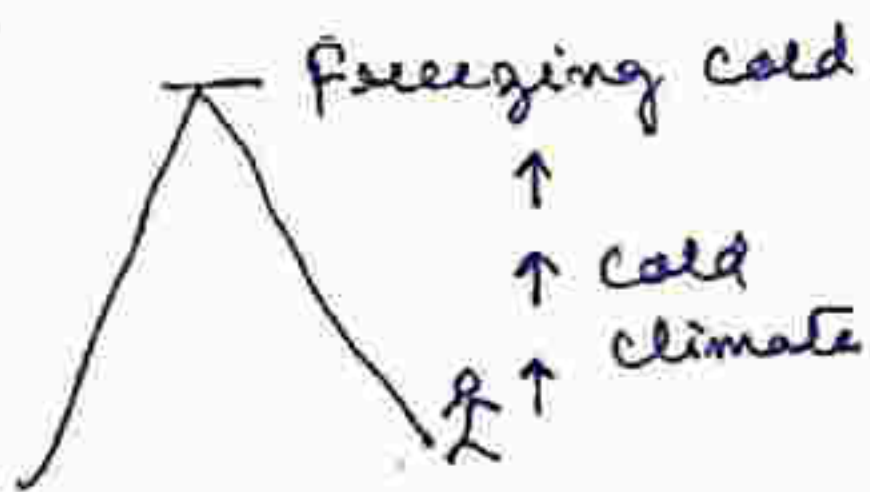
Since India has monsoon type of climate drought and floods are integral to monsoon rhythm.



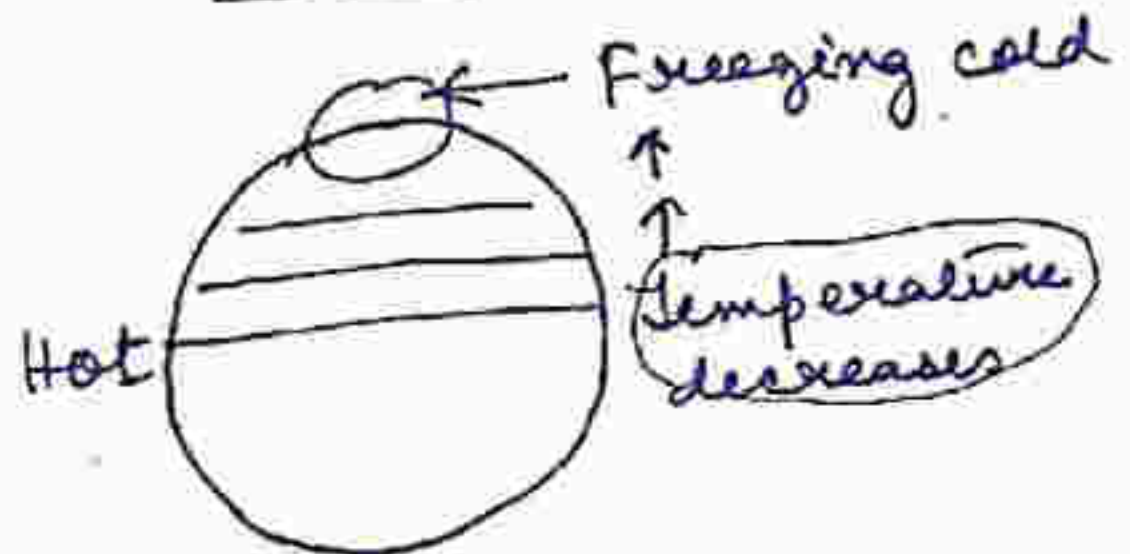


⑤ Climate

Altitude

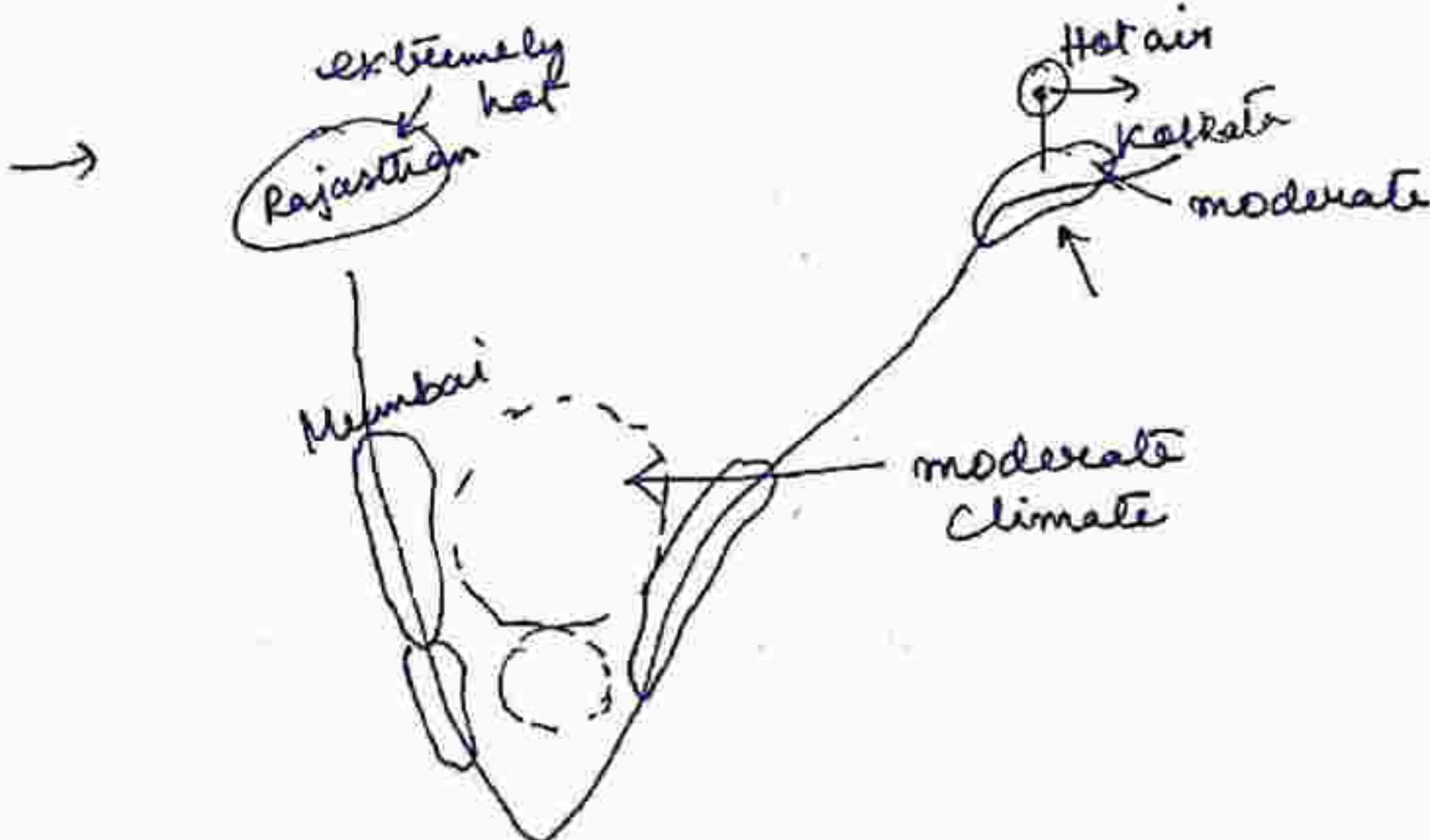


Latitude



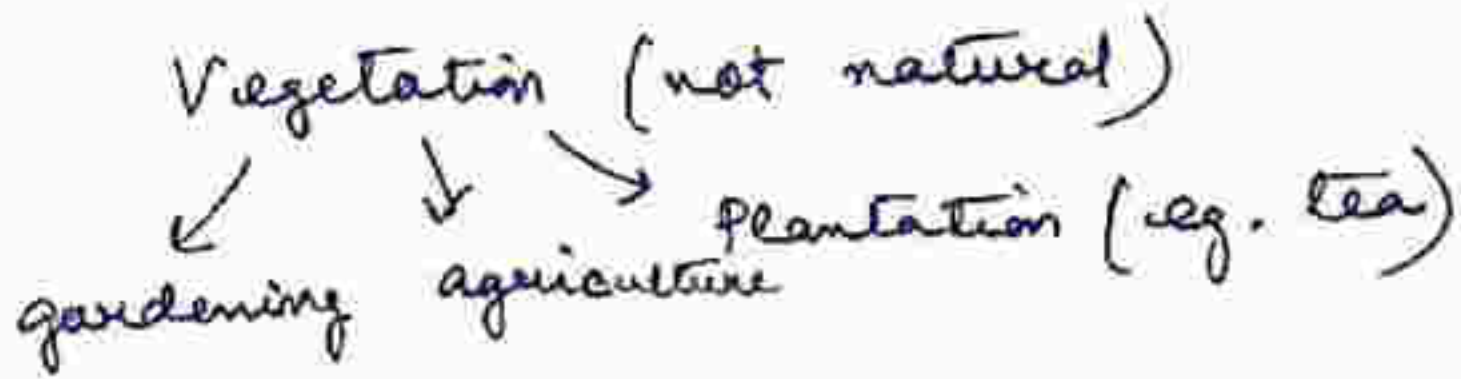
'Altitude mimics latitude'

**Mawsynram** [World's highest rainfall]




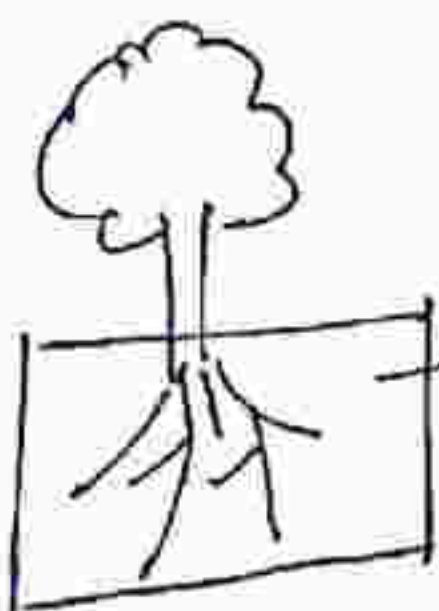


### ⑥ Natural Vegetation



### → Vegetation:

- ① — Tropical evergreen forest!
  - Remains green throughout
  - don't shed leaves at same time
  - areas of heavy rainfall.
- ② — Tropical deciduous forest
  - shed leaves at particular time of year ②
  - large part of our country [MP, UP, Bihar, Jharkhand, Ch. Parts of MH → sal, teak, neem etc]
- ③ — Thorny bushes.
  - no moisture condition
  - certain adaptability to survive
  - trees modify themselves to adjust in such climate → change in attributes — roots/stems/leaves
  - Thorns, — minimise surface area, water can't evaporate
- ④ — Mountain Vegetation
  - 1500 - 2500m. →  ← conical trees
  - eg - Chir, Pine, Deodar
- ⑤ — Mangrove forests.
  - adapted to survive in saline water
  - O<sub>2</sub> deficit condition due to water logging
  - Coastal regions eg. Sunderbans.



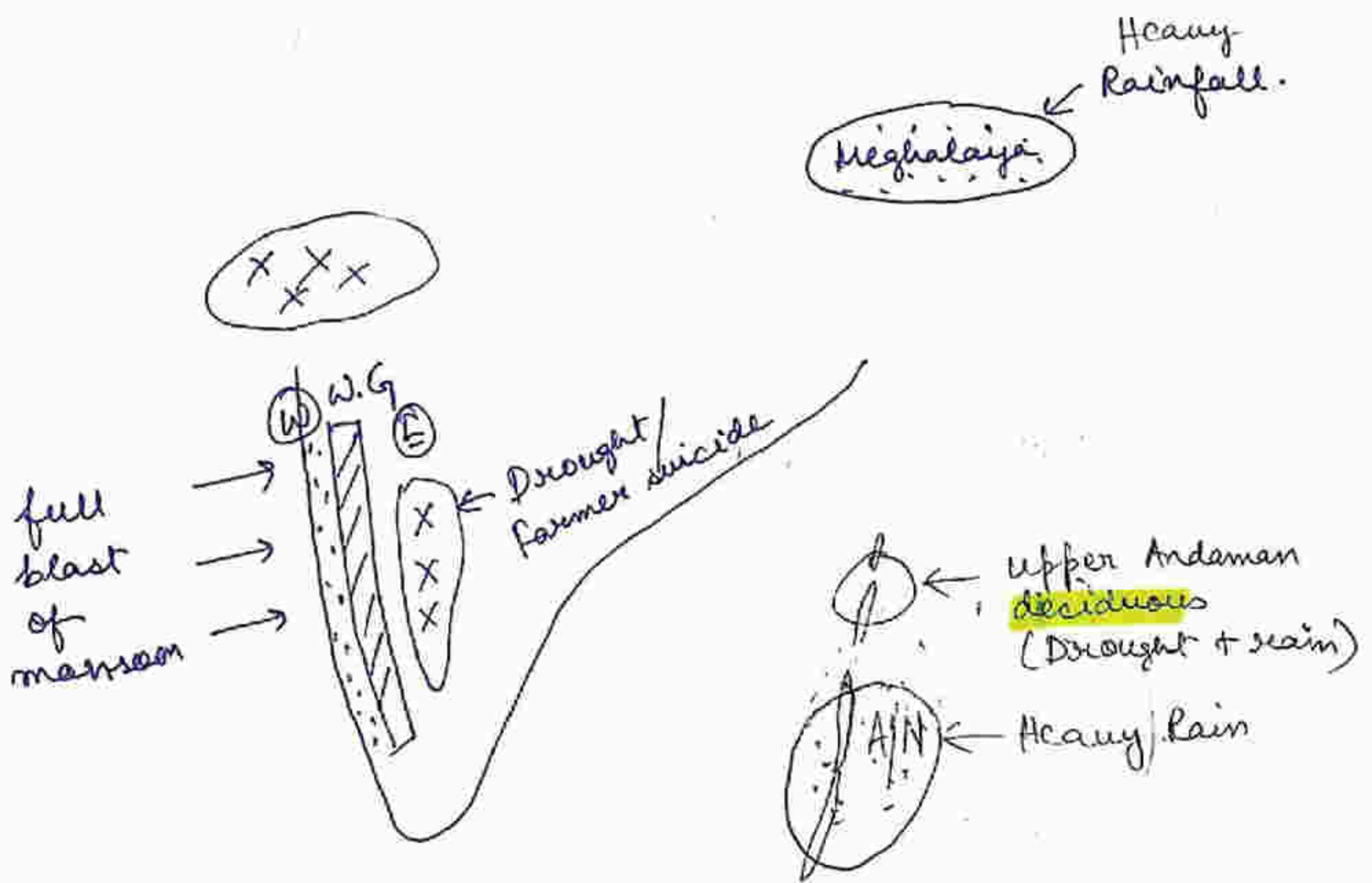
H<sub>2</sub>O  
less access to O<sub>2</sub>  
saline + fresh.



- moisture chief determinant of forest
- monsoon rhythm → Flood → Leaves Remaining
- Drought → Water stress → shed leaves

Deciduous trees (monsoon type of forest)

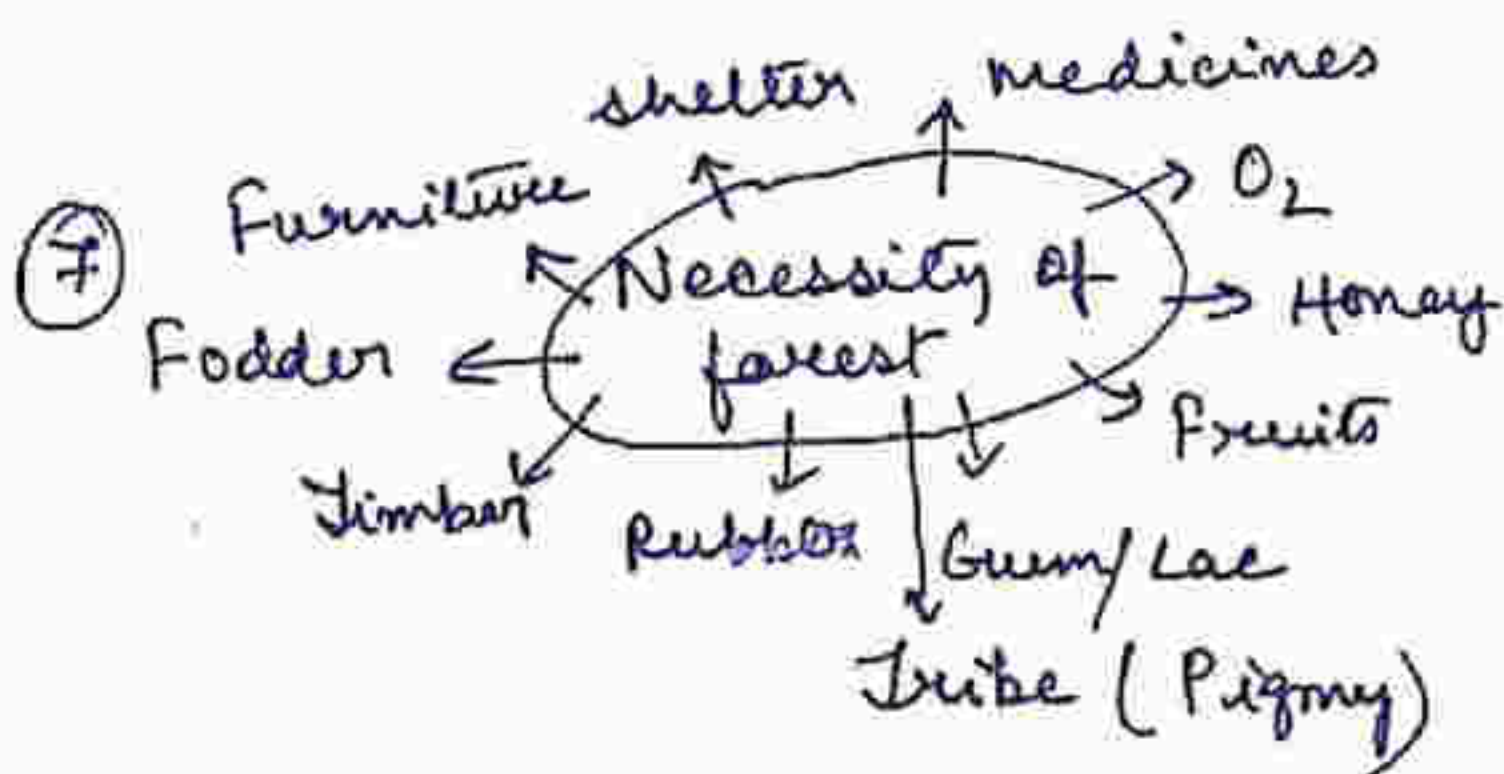
- 'Floods + droughts' integral to monsoon rhythm



☐ Tropical evergreen forest  
eg. mahogany, ebony, rosewood.

[ A/N  
- Parts of N.E states  
- Narrow strip of W. slope of W.G ]

☒ Thorny Bushes [ E. slope of W.G  
+ Gujarat, Rajasthan, Punjab  
Haryana ]  
eg. Cactus, babool etc.





## Wild life

- Gir Forest - Gujarat (Asiatic lions)
- Assam - Elephants, one-horned rhino.
- Elephants → Karnataka (maximum)
- Protection of wildlife + Biosphere Reserves
  - + National Parks
  - + Sanctuaries.
- Projects + P. Tiger
  - + P. elephant.
- Migratory birds - Pintail Duck  
Flamingo etc.