

Geography Foundation

12/04/24

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Biogeography & Env. Geography

12:00-2:30 Lec-4

Compensation point - Amount of photosynthesis required to meet the respiration needs of plants. Any photosynthesis less than compensation point will not be enough for plants survival & additional photosynthesis over respiration is what the plant utilizes for its growth beyond respiration

Patterns of Life form Distribution -

- 1] BIOMES [Role of climate]
- 2] BIOGEOGRAPHICAL REALMS [Evolution history]
- 3] GENE POOL CENTRES [Agriculture]
- 4] ECOSYSTEM APPROACH [Relationships]

Biogeographical Realms -

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o Although climate is the most imp factor in type of vegetatⁿ, faun^a & associated faun^a, not all distribution of plants & animals can be explained entirely on basis of the climate

o There are location that may have same type of climate yet assemblage of plants & animals can be different

Ex Australia have very similar climate of Africa but life form varieties are diff-erent

o Some of other factors that determine how life forms are distributed are -

a] Continental Drift

b] Climate change

c] Migration of Life forms

d] Orientation of mountains & presence of barriers that can restrict

how life forms move & spread Prav80818

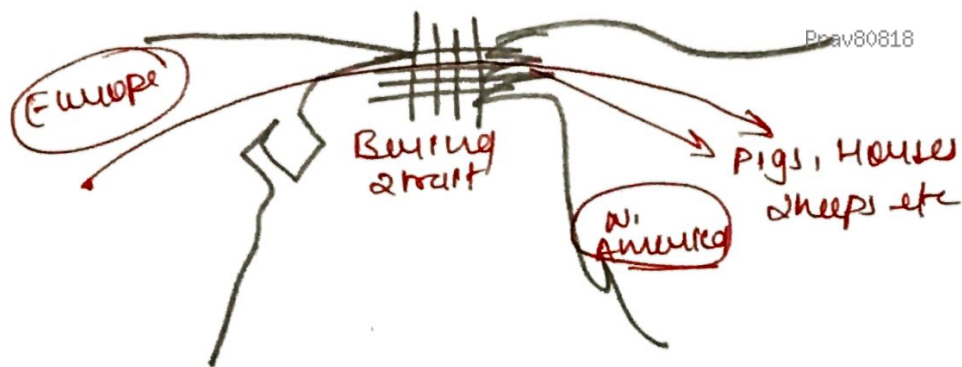
e] The different process of speciation -
how species evolve.

o when all the above factors are accounted
together, the patterns of distribution are
referred to as Biogeographical realms

o The distribution of life form is \therefore not
necessarily in correlation with climates of
today.

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a] If we compare N. America & N. Europe,
the climates are fairly comparable but
range of life forms & distribution in N. America
& N. Europe is not same

EX N. America have received life forms
migrating from Asia across Bering Strait
where during one of glacial phases, Siberia
was connected to Alaska



The assemblage of life forms of N. America includes animals like Grizzly bear, Moose, Elk, Black dogs, wolves, Cougars.

b) In Europe also, there is a North-South difference of life forms because of the Alps that act as barriers but such a distinct is not there in N. America

c) N. America & S. America are connected but life forms are 2 continents are different while N. America has large carnivores mammals, S. America has more reptiles, amphibians & birds. The life forms of N. America & S. America have not migrated across Isthmus of Panama because the two continents remained separated for long

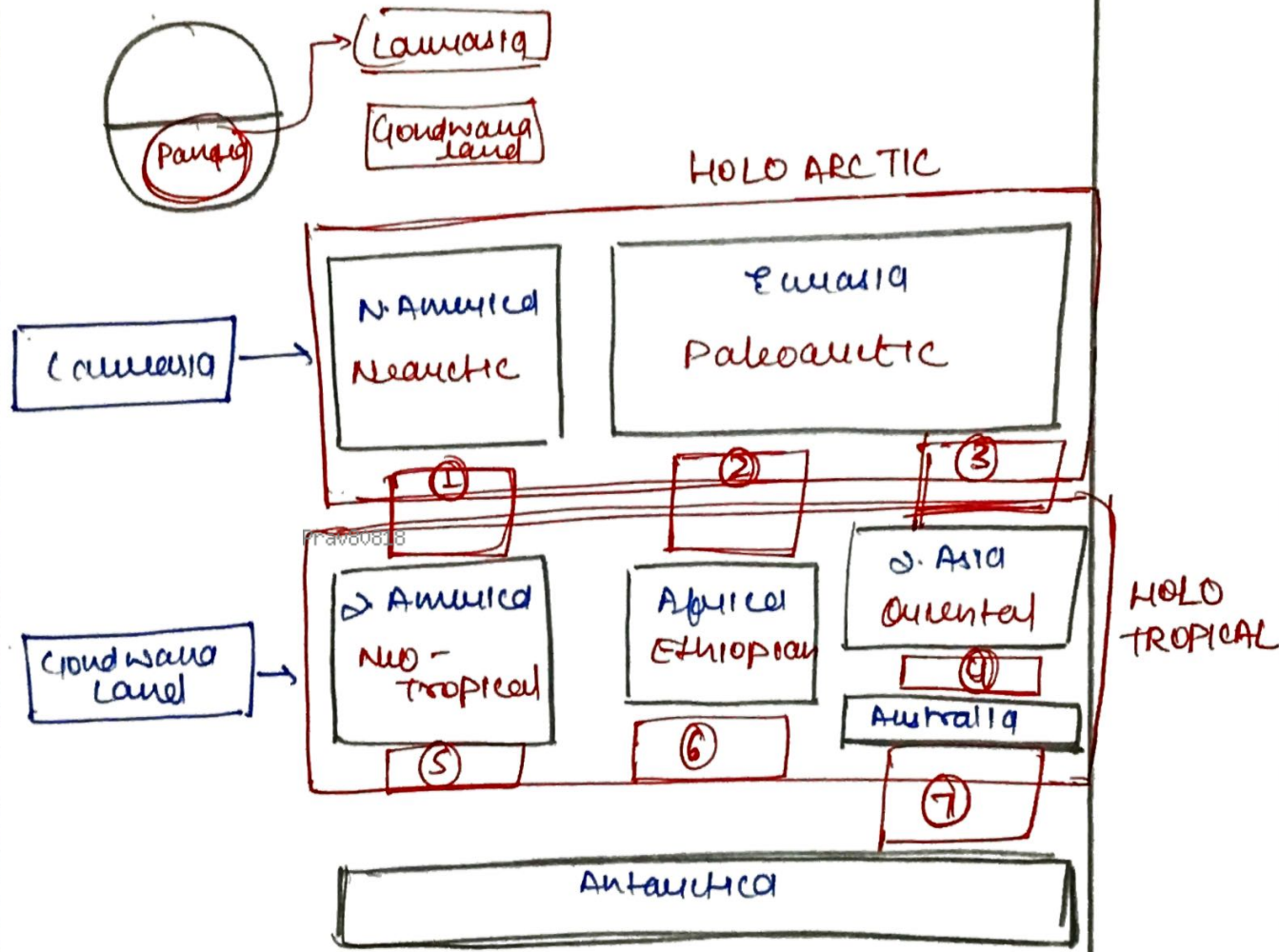
Time & Mexican desert continues to be a
major barrier Prav80818

- d) Despite the same Tropical climate of
Australia & Africa, Australia separated from
Africa in mid mesozoic time before the
evolution of large mammals / carnivorous
mammals. So the life forms of Australia
includes Marsupials & Monotremes [Egg laying
mammals like Platypus]
(Kangaroo,
Wallaby,
Koala bears)

Different schemes of Biogeographical

Realms -

① Genetic Scheme



- N. America = Neartic
- S. America = Neo tropical
- Eurasia = Palearctic
- Africa = Ethiopian

 - Represents Transition zone

◦ Asia = Oriental

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◦ Australia =

◦ Africa + Asia + ~~Other~~ Australia =
Paleotropical

◦ Neartic + Palearctic = Holarctic

◦ Gondwana - Antarctica = Holo tropical

(2. America +
Africa +
Australia +
Asia)

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◦ There are transition zones b/w above
zones. There are 7 transition zones ÷

① Mexican Transition Zone
(b/w Neartic & Neotropical)

② Sahara T.Z (b/w Palearctic
& Africa)

③ New Zealand

T.Z
(b/w Australia &
Antarctica)

③ Chinese T.Z (b/w Palearctic &
oriental)

④ Indo-Malayan T.Z (b/w Palearctic & Australia)

⑤ Patagonia T.Z (Neotropical & Antarctica)

⑥ Cape Roubine T.Z (Africa & Antarctica)

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o There are two types of Biogeographical Realms :-

① Biogeographical Realms of Animals

Fauna of Animal Kingdoms. There are 3 major schemes of Animal Kingdom

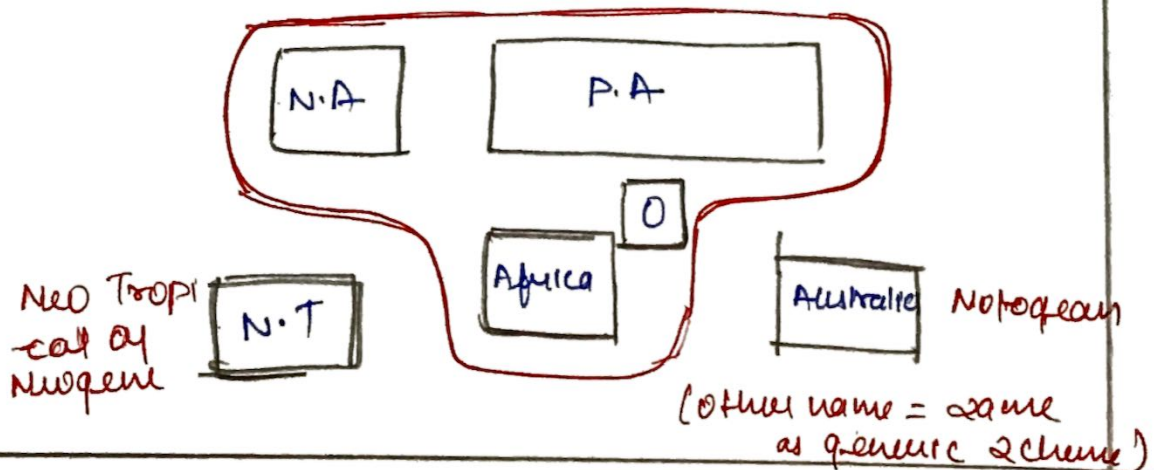
① Wallace scheme

o same as Generic scheme - Antartical & - Antartical Transition zone

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② Schlater scheme - for birds

③ Schmidt's scheme



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(b) BIO geographical Realms of Plants /
Flora or Plant Kingdom. 3 schemes ÷

- | | |
|----------------------|------------------|
| (1) Newbigin scheme | } Generic scheme |
| (2) Engelm's scheme | |
| (3) Takhtajan scheme | |

while writing about any Biog-ographical
 in main answer ÷

- | | |
|---|------------------------------------|
| a] continent | } structure to write answer on B.R |
| b] countries | |
| c] Biomes / climate | |
| d] species | |
| e] Relate with other Biogeographical Realms | |

EX (1) Neo Tropical Realm / S. America

- o ≡ S. America - (Panama-Mexico zone)
- o - Patagonia zone
- o It includes countries like Brazil, Argentina, Colombia, Chile etc

o Amazon forest, Pampas, Deserts

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o Following Regions of Neo Tropical Realm

1] Equatorial Rainforest of Amazon

Forest - Dense forest, tall trees,
high Biodiversity, Swamps

2] selvas

3] tropical Grasslands - Brazil, Venezuela
(Sertao / (Llanos)
Matogrosso /
Cerrado)

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Suriname, Guyana
(Llanos)

4] Temperate Grassland - Pampas of
Uruguay & Argentina (Alfalfa &
Lush grass)

5] Atacama Desert - xerophytic vegetation

6] Variety of Birds - Toucans (Amazon)
Parakeets, Macaw

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7] Animals - Armadillos, Ant Eaters,
snakes like Anaconda, Llamas &

Alpache.

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◦ S. America lacks large carnivores like Lions, Wolves & also lacks large herbivores Elephants, Giraffe etc

◦ S. America broke from Africa & remain separate for a long time much before evolution of present range of life forms

◦ S. America is connected to N. America but their life forms are different

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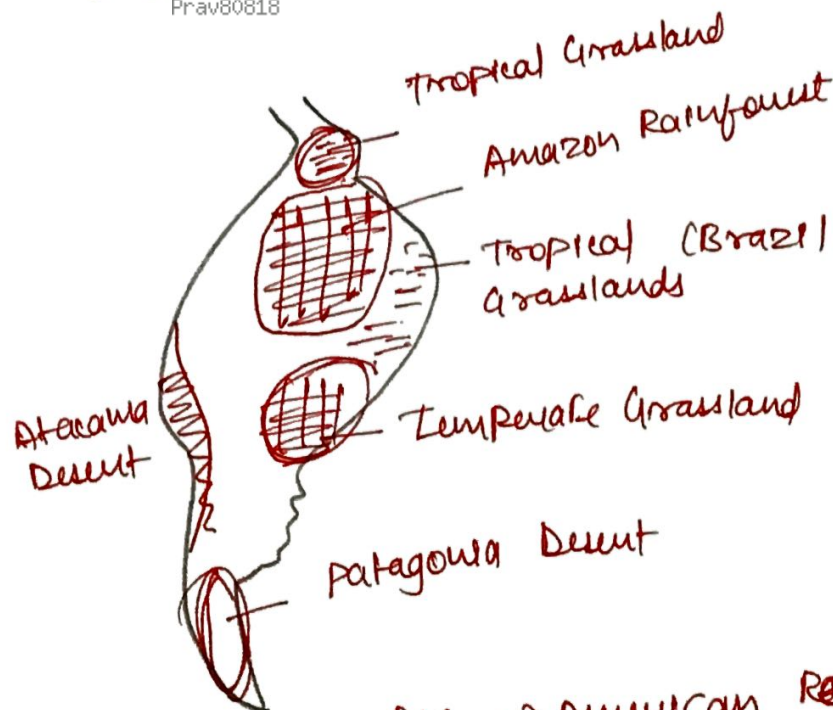
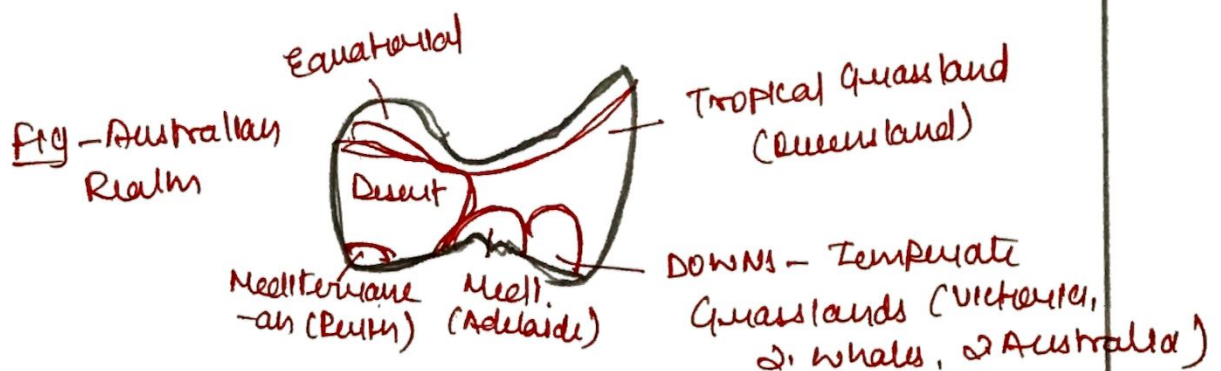


Fig. S. American Realm

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② Australia | Notogean

- Notogean Realm under ~~sch~~ Schmidt Fauna Kingdom.
- Following type of region-
 - 1] Deserts on West (Australia, Simpson, Victorian Desert, Gibson Desert, Sandy Desert etc]
 - 2] Tropical Grassland present in state of Queensland
 - 3] Temperate Grasslands - Downs of Victoria & S. Australia & New S. Wales
 - 4] Mediterranean Realm (Perth & Adelaide)



- Australia separated from Gondwanaland in mid Mesozoic before the evolution of

large Mammals & Carnivores \therefore Australia has unique life forms like Marsupials & Monotremes, Eucalyptus.

o Australia has numerous varieties of Eucalyptus including short bushes & grasses locally called as Mulga grasses & Mallee forest

o The Australian Realm is very close to S.E Asia & Indo-Malayan Region, there have been attempts at drawing boundary that separates Australia from Indo-Malayan Realm. It was Wallace who demarcated boundary & line is called as Wallace line.

#Reference - Pg 263 [Rupa Made Simple]
↳ Map - World Zoogeographical Region - Wallace line

③ African / Ethiopian Realm -Prav80818

- o African continent but south of Sahara
- o Countries - Ethiopia, Sudan, Congo, S. Africa etc
- o Regions ÷
 - a] Savannah Region
 - b] Equatorial Region
 - c] Tropical Desert - Namibia
 - d] Mediterranean climate - Cape Town

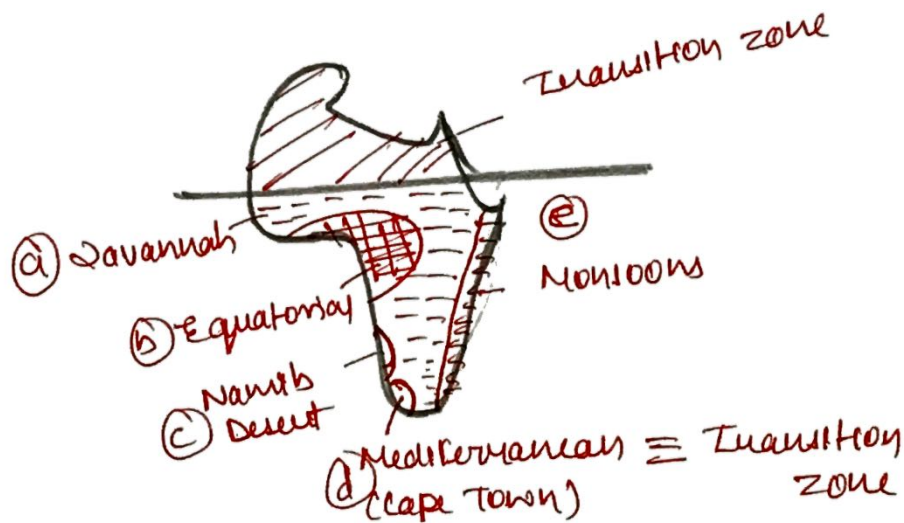


Fig - African Realm

o African / Ethiopian B.R is mainly the savannah landscape. It is not a true grass-land like the steppes of Russia or Ukraine. Savannah have seasonality of rains & can ~~get~~ have good rains for few weeks causing floods.

o Savannah - also called as Parkland Landscape

o Africa has large mammals both herbivores & carnivores (because of presence of large open space) unlike other landscape

o African Reptiles have commonalities with Asia. Africa is where mammals evolved along with Apes, Homioids & Hominids (Man evolved)

o Both, Australia & S. America broke & separated from Africa much earlier before evolution of large mammals & carnivores. But S. Asia remained in

contact with Africa for a longer time,
hence S. Asia/Oriental region have a lot
of similarities with Africa such as
commonalities of elephants, cow, lions,
cattle & other species

Reference - Pg 262/263 [Rupa Made Simple &
BOOK]
↓
Factors in
Distribⁿ of species.

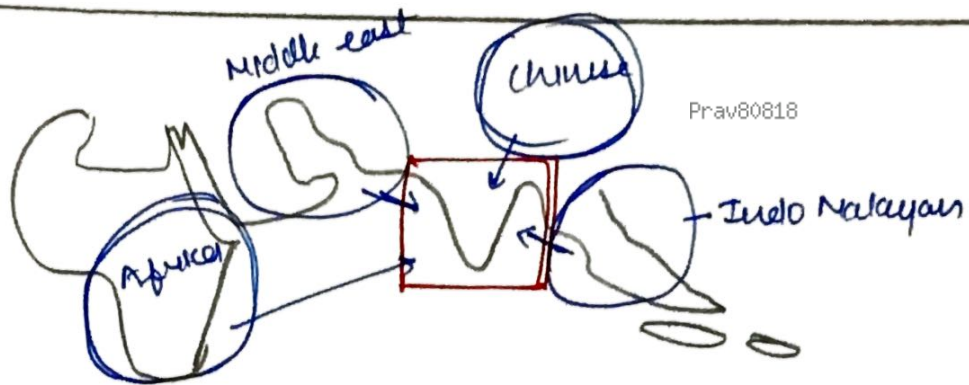
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Biogeographical Realms of India - Prav80818

[If asked - know the region & write about
various ponding Indian forest & species]

- o India - part of S. Asian (Oriental B.R)
- o India has commonality with African Realm
because S. Asia was last to break from
Africa
- o Indian climate & monsoons are variant
of savannah & hence forest of India
are deciduous forest & common Indian
deciduous species - Teak & Sal
- o Indian Biogeographical Realm has influence
of Topography also
- o India has influence of Chinese & Indo-
Malayan Transition in North & in the
East.
- o It also has impact of Tropical Dry condition
of Middle East



o India has also been impacted by deliberate implants where life forms & species has been brought in India because of Human

Factors:

- EX
- o Eucalyptus
 - o Tomato Prav80818
 - o Spices like Cloves
 - o Tea & Coffee
 - o Melon Fruits
 - o Nuts
 - o Potato
 - o Rubber
 - o Maize
 - o Soyabean
 - o Oil seeds

o And that is because India has been a major destination for a long trail of migrants from C. Asia, Middle east & Africa

• following are 10 Biogeographical Realms of India - Prav80818

1] Trans Himalayan (Kashmir & Ladakh Region)

2] Western Himalayas

3] Eastern Himalayas & Highlands including Purvanchal Hills

4] Western Dry Region & Deserts

5] Semi Arid Regions of Rajasthan Prav80818

6] Northern Gangetic Plains including UP, Bihar & Bengal

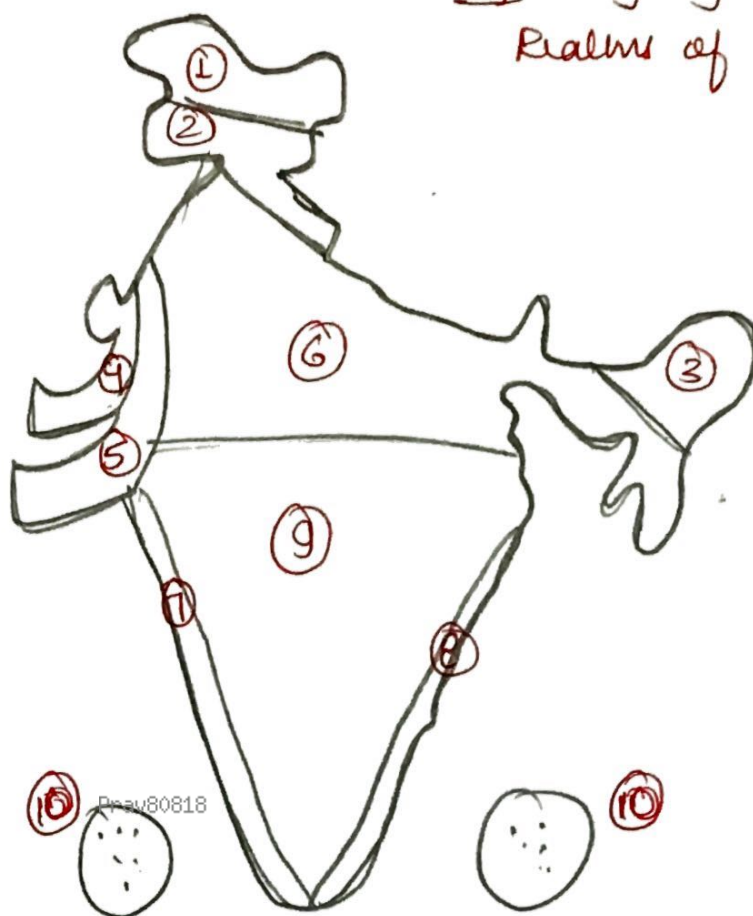
7] Western Ghats & Coastal Plains

8] Eastern Ghats & Coastal Plains

9] Peninsular Plateau & Deccan Region (Plateau south of Vindhyas)

10] Islands (AN, Lakshadweep)

Fig Biogeographical
Realms of India



- 1] Trans Himalayas
- 2] Western Himalayas
- 3] Eastern Himalayas & Highlands
- 4] Western Dry Region & Deserts
- 5] Semi Arid Regions of Rajasthan

- 6] Northern Gangetic Plains
- 7] Western Ghats & Coastal Plains
- 8] Eastern Ghats & Coastal Plains
- 9] Peninsular Plateau & Deccan Region
- 10] Islands