

GSSCORE

An Institute for Civil Services

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AIR 113

CSE 2023

GEOGRAPHY



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iasscore.in

GEOGRAPHY

Time Allowed: 3 Hrs.Max. Marks: 250

Instructions to Candidate

- There are FIVE questions. All Questions are compulsory.
- 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 questions, wherever specified, should be adhered to.
- Attempts of questions shall be counted in chronological 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 answer book must be clearly struck off.

* Avoid writing beyond margins
Try to write within borders
space. (It could lead to
penalisation of marks by
UPSC).
* Content is good.
Keep it up!

Name RISHENDRA SINGH

Mobile No.

Date

Signature @ishendras

1. Invigilator's Signature _____

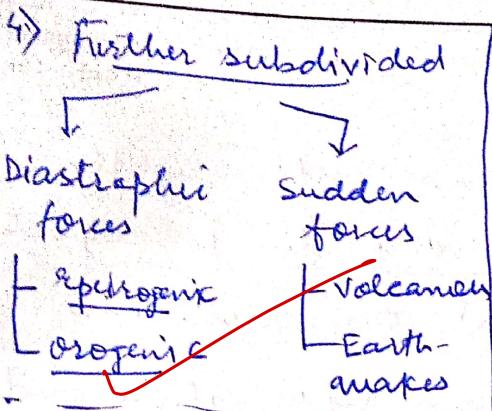
2. Invigilator's Signature _____

1. (a) Compare and contrast exogenetic and endogenetic forces in landforms development.
(150 Words) (10)

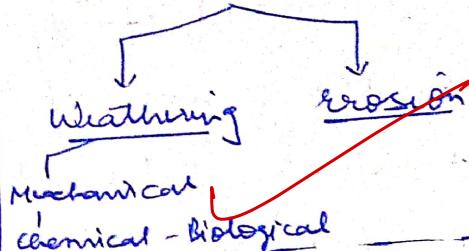
Gillert's concept of "dynamic earth" rightly proposes the presence of endogenetic & exogenetic forces which states that there exists a state of balance between "deformation" and "creation".

Endogenetic forces	Exogenetic forces
1) act from within the earth's surface <u>Ultimate energy = Primordial heat</u> <u>Radioactive decay</u>	act from <u>outside</u> the surface <u>Ultimate energy \rightarrow Sun</u>
2) Creation of <u>initial Landforms</u> <u>Landform of 1st order</u> (continents, ocean) <u>Landform of 2nd order</u> (mts, plateaus)	<u>Creation of <u>sequential</u> Landforms</u> ④ <u>Landform of 3rd order</u> <u>Alluvial plains</u> , <u>Conga plains</u> , <u>Delta, Loess, etc</u>
3) Act <u>tangentially or radially</u>	3) No specific direction depends upon <u>exogenic erosional forces</u> (rain, wind, glaciers, etc)
Remarks	

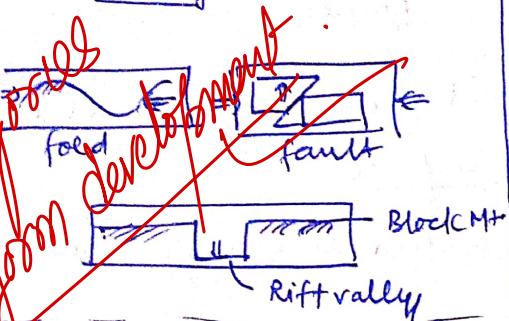
fairly relevant



Subdivision occurs in the form of:



5) Creates faults, folds and rift valleys



5) No such landforms created

Rather, shape the existing features

(1) Mountains → Plains

(2) Various erosional & depositional landforms created

Valid point

Thus, the landform development by converting the original settled features of the landscape is done through endogenetic & exogenetic

forces. Various unseen topographical features on earth's surface is a result of varying forces acting on it.

Remarks

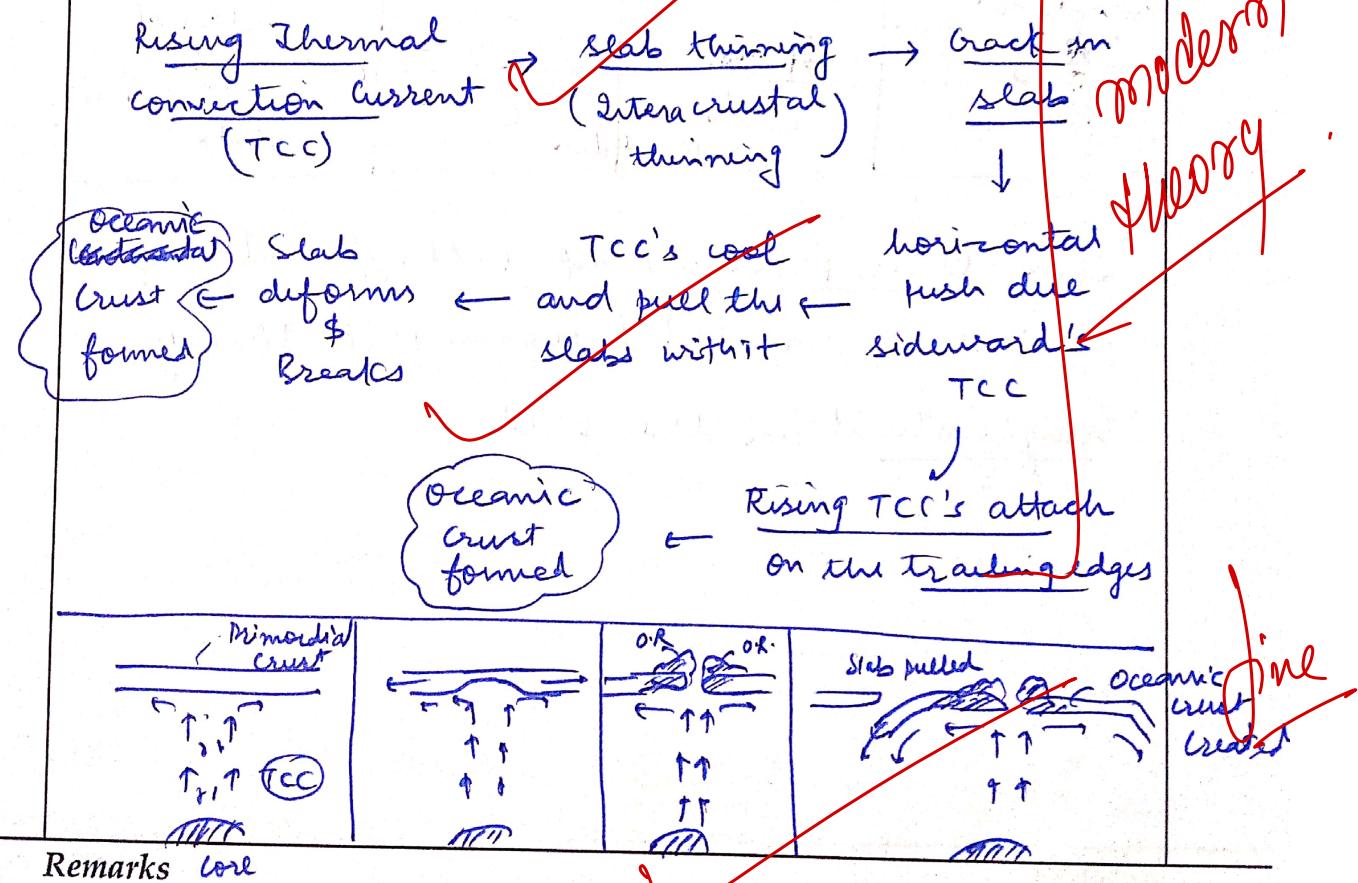
3.5

1. (b) Discuss the theories of the origin of the Earth's crust. Evaluate the strengths and weaknesses of each theory. (150 Words) (10)

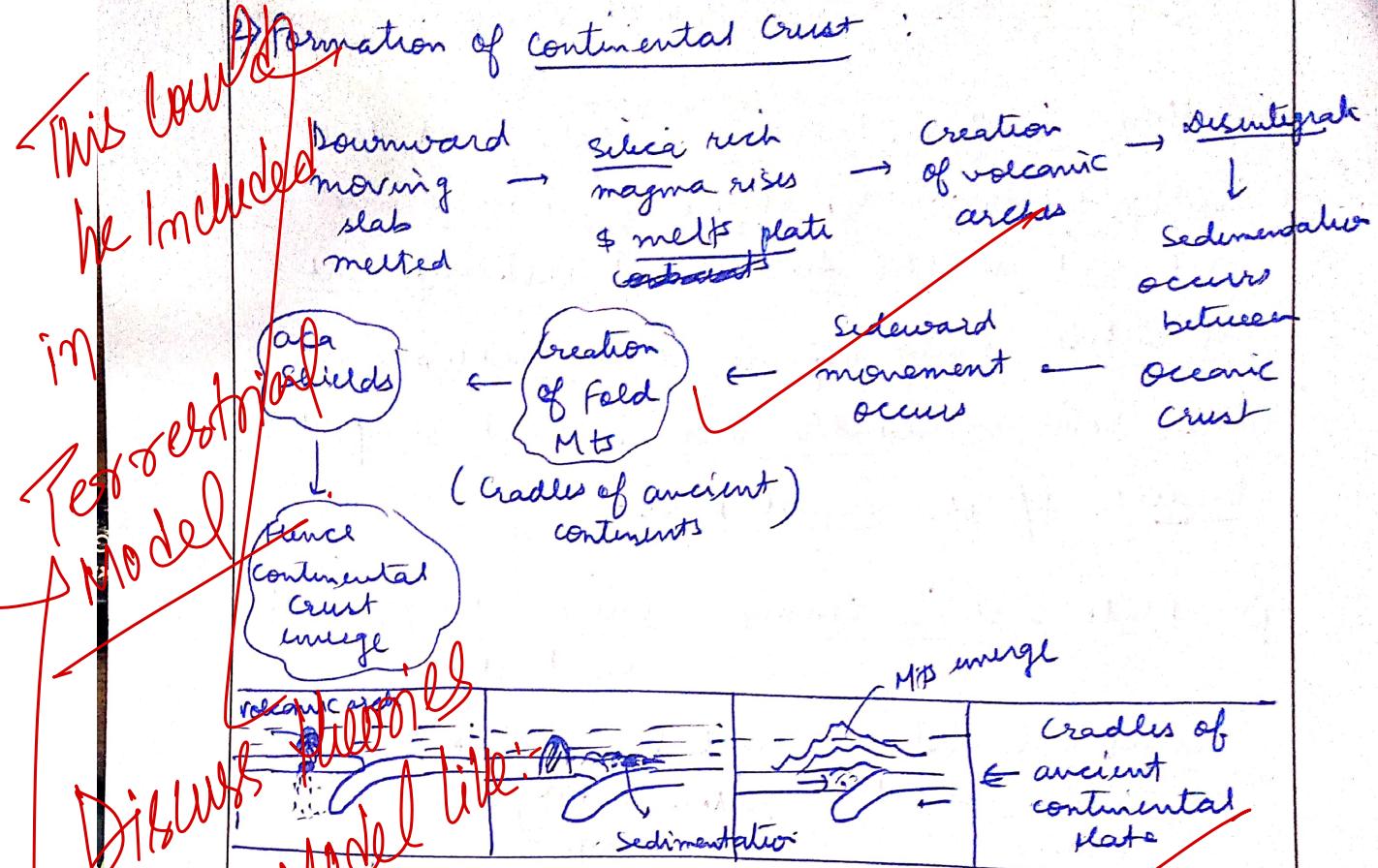
~~Devant Part~~

Dutton's uniformitarianism states that the processes acted in past are acting now and will act in the future but with different intensities truly defines that earth's crust has been constantly evolving and shaped because of its varied past.

▷ Plate Tectonic Theory (Wilson, Morgan and Mackenzie)



Formation of continental crust:



Thus, these processes define the formation of various continents & oceanic plate theory

having evolved in the past.

Accretion Model

Impact Model

Remarks

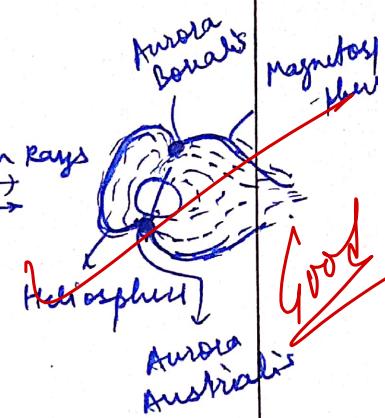
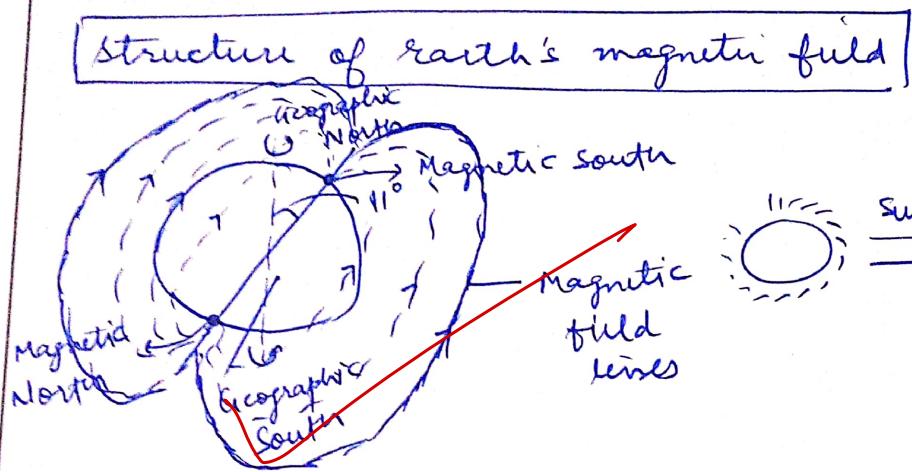
Terrrestrial Model

*Refer Discussion sides

1. (c) Describe the structure and composition of the Earth's magnetic field. Discuss the role of the inner core, outer core, and magnetosphere in generating and shaping the geomagnetic field.
(150 Words) (10)

~~Jine
In HFO~~

Initial tries of explaining the earth's geomagnetic field was done by C. Gilbert via his Bar magnet theory which explained the structure and composition of earth's magnetic field (\vec{B}).



Composition of earth's Magnetic field: ↗

- 1) Magnetic declination - Measured by the angle made between earth's geographical N & S and magnetic field lines.
- 2) Magnetic inclination - angle between earth's surface and magnetic field line (Measured via - Dip Needle)
- 3) Magnetic Intensity - measured via magnetometer

Remarks

Role of I. Core, O. Core & Magnetosphere in generating B

Earth acting as "self exciting dynamo"

Role of I. Core & O. Core : I. Core - Solid

\Rightarrow Difference in composition [O. Core - Liquid]

Difference in temp & pressure \Rightarrow as Earth moves from W \rightarrow E
 O. Core - also moves from W \rightarrow E
 \Rightarrow but correspondingly \rightarrow I. Core \Rightarrow E \rightarrow W

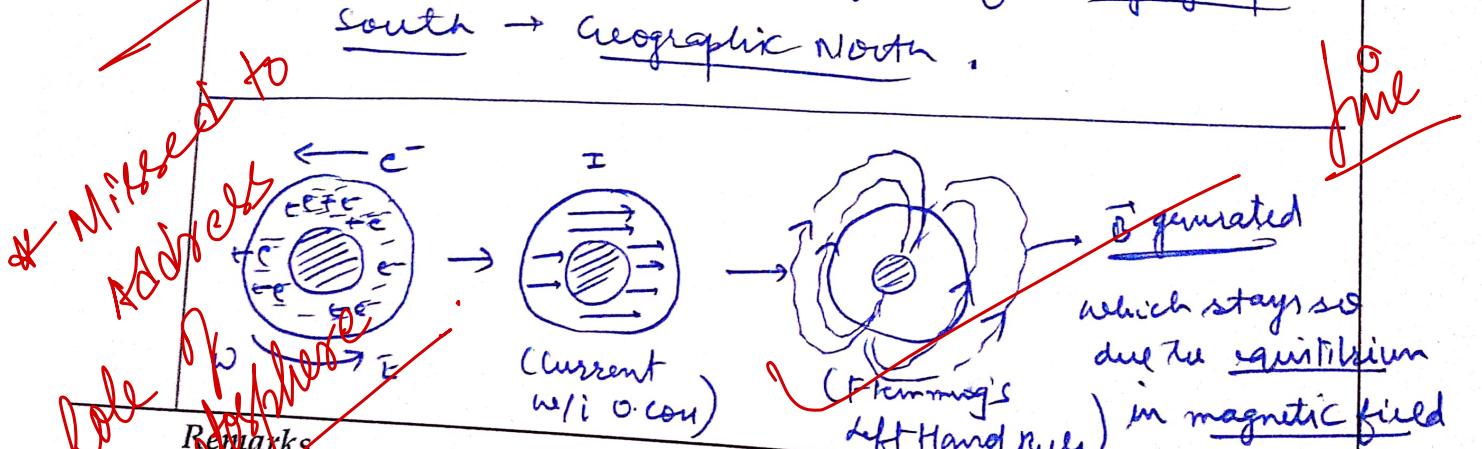
Difference in velocities of particles contained

(Liquid \Rightarrow Ionise)

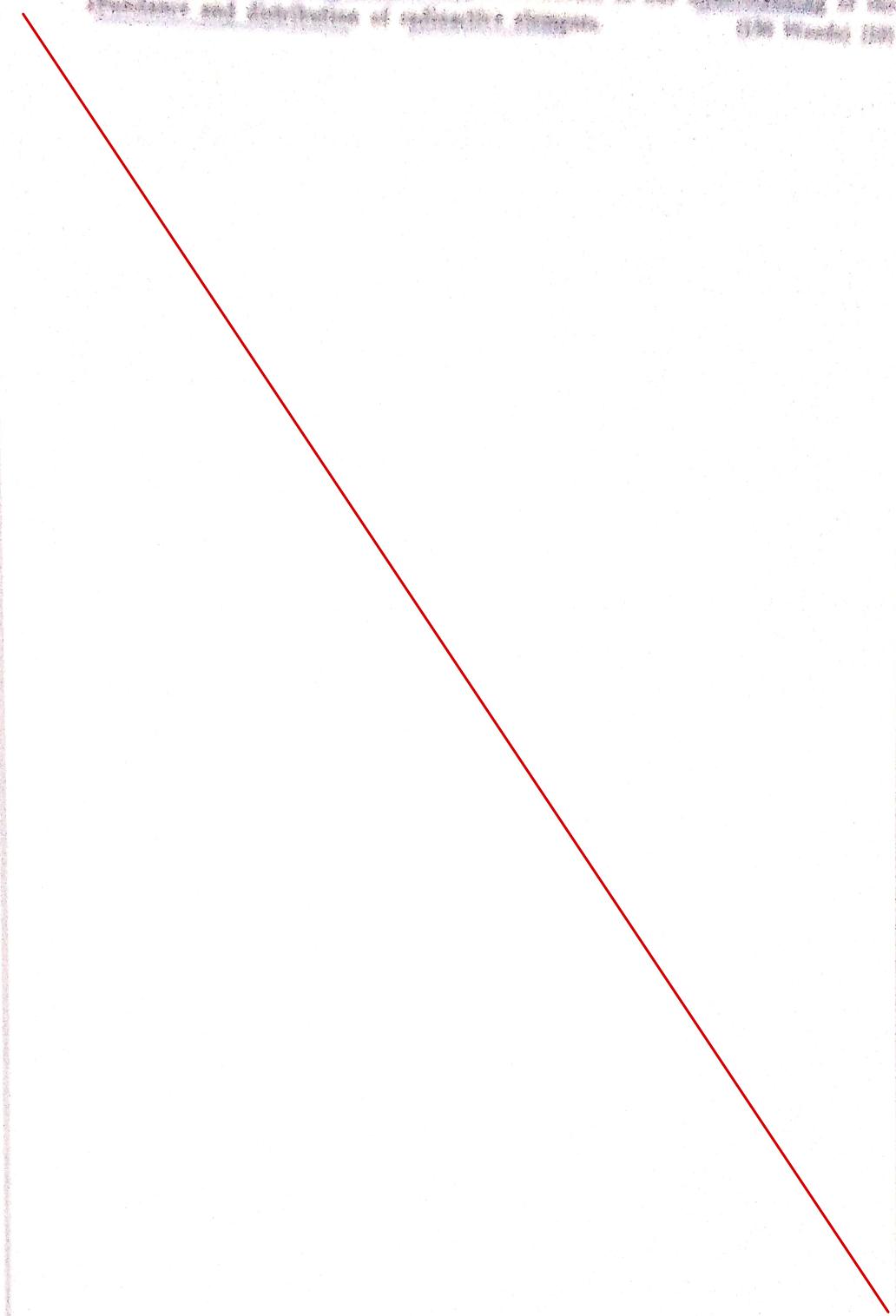
and electrons too move from E \rightarrow W (wrt I. Core)

led to formation of self sustained loop
 \Rightarrow then exists a pre-existing magnetic field,
 it gets intensified due to the current generated in O. Core (Fe, Ni ions).

Geodynamo
 \Rightarrow Applying Flemings Left Hand Rule, the magnetic field can be found from geographic South \rightarrow geographic North.



- Q. Discuss the concept of generalities and their role in making the theory unique. Explain how generalizing measurements contribute to our understanding of the structure and development of cognitive abilities.



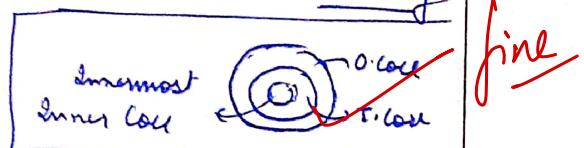
Remarks

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1. (e) Discuss the findings of recent studies on mantle plumes and their role in the dynamics of the Earth's interior. Explain any new insights into the origin, behaviour, and impact of mantle plumes based on these studies. (150 Words) (10)

*Decent
format*

Mantle plumes are irregular hot regions within Earth's Mantle (part of Asthenosphere) which constantly rise and fall due to thermodynamic imbalances created due to the Radioactive decay in earth's core.



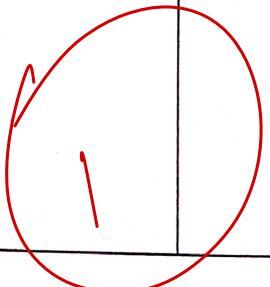
fine

* You need to mention recent discovery of an extra layer within Earth's core (innermost inner core) by geographers have forced the study more about mantle plumes and their impact.

Mention and handle their findings

Deep E.R. Study
by park
Biosonic wave
study by jha
Remarks by btr.

* Conclude with suitable conclusion



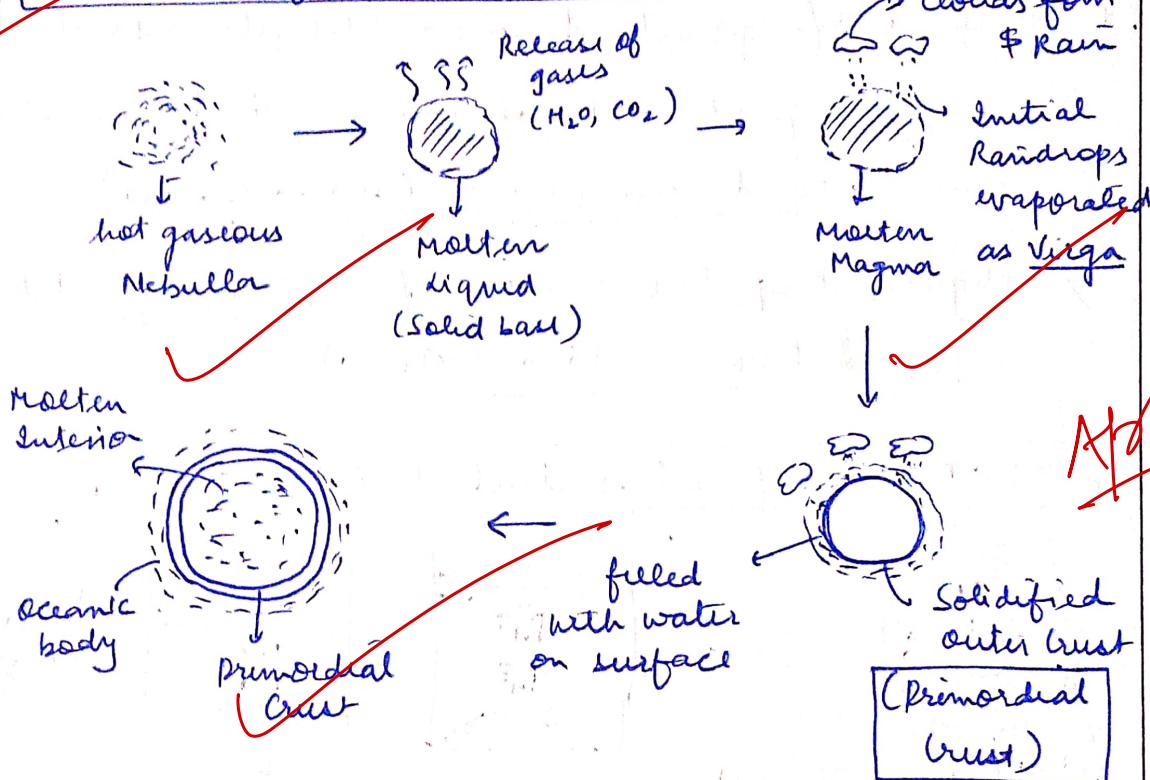
2. (a) Discuss the concept of primordial crust and its significance in understanding the early stages of crustal formation on Earth. Explain how the composition and structure of the primordial crust have evolved over time. (200 Words) (15)

4.5 bn years ago, when the Earth initially got shaped, it was hot, red and constantly explosive ball of H₂ and He atmosphere which blew away due to the solar winds.

~~Debris~~

~~Formation
Evolution~~

Formation Evolution of Primordial Crust:



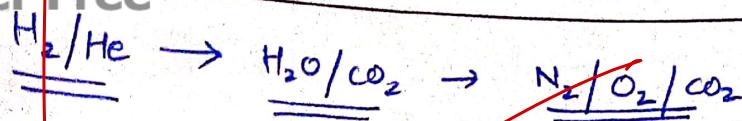
Significance in understanding early stages of crustal formation:

- ① Helps geographers to understand initial atmospheric composition

Remarks

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~~evolution of atmospheric gases~~

~~2) Study future evolution of current crust
i.e. oceanic & continental crust.~~

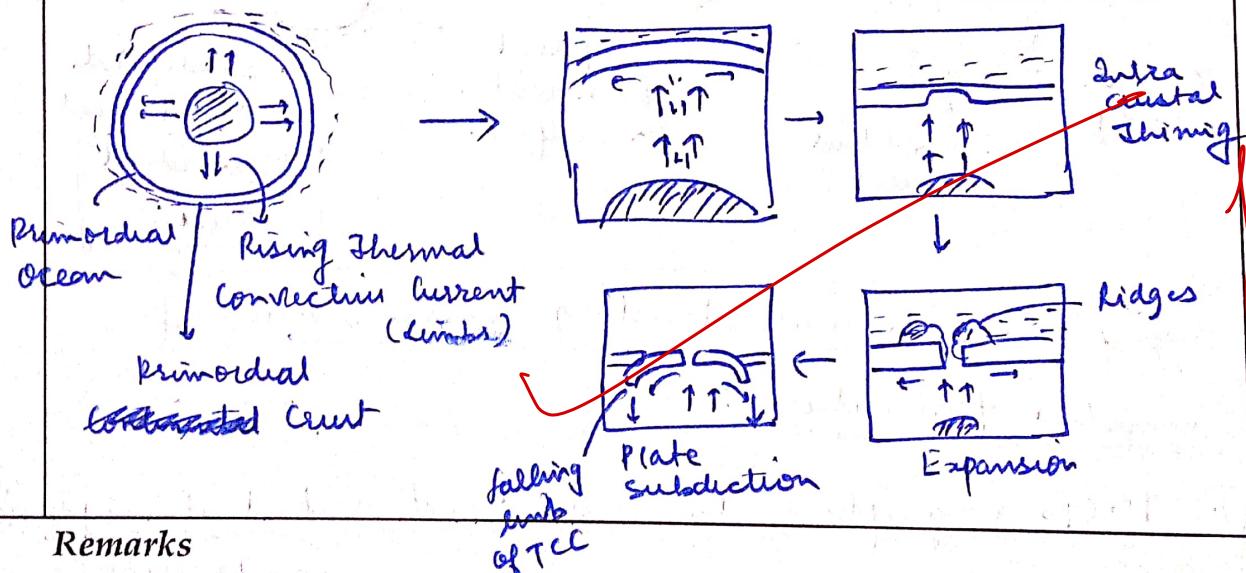
~~Another point
3) presence of water on surface \Rightarrow led scientists
to believe that 1st life signs @ water bodies~~

~~4) Impact of plants & so on the atmosphere~~

~~5) Beyond carboniferous period & from
camrian period (600 mn yrs ago)~~

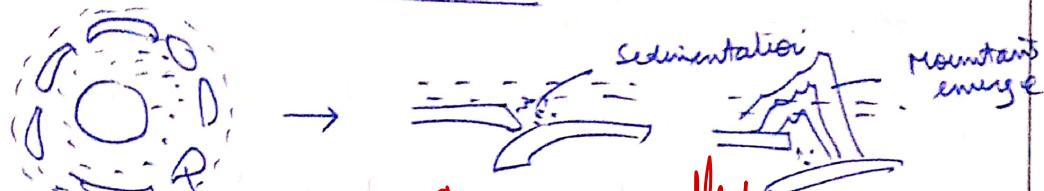
~~5) Highlighting the reason of crustal fragmentation
(i.e. interior molten magma).~~

EVOLUTION of primordial crust over time



Remarks

1

Formation of oceanic crusts

2 Formation of continental nuclei

Further Evolution

Rift Valley

Wear Sea

open OCEAN
etcWater covered
Continental
crust

3

Further, both oceanic crust and continental crust evolved from the primordial crust and its fragmentation and sedimentation acting as the cradle of present day continents and mountains

fire

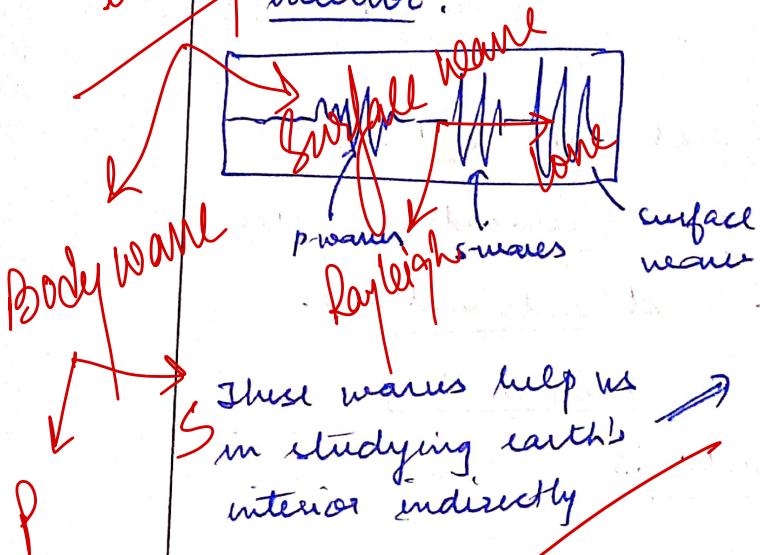
5.5

Remarks

2. (b) Analyse the role of seismic waves in studying the physical conditions of the Earth's interior. Discuss how seismic waves provide insights into the composition, density, and structural properties of different layers. (200 Words) (15)

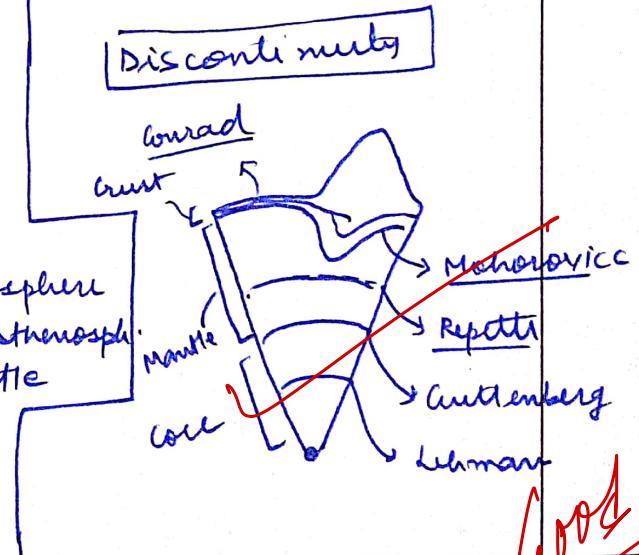
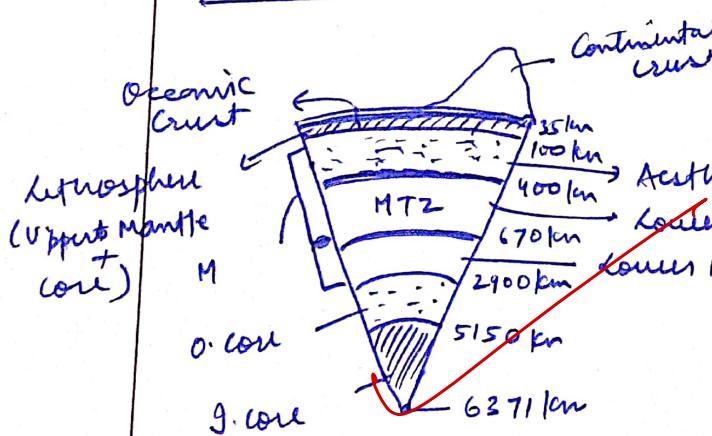
~~good start~~

~~However, seismic waves are released from hypocenter of an earthquake which travel in all directions and help in studying earth's interior.~~



P-waves	S-waves
travel in all medium	only in solid
1st to arrive on surface	last to arrive
Movement is parallel to particles of medium	Movement is in the medium particles

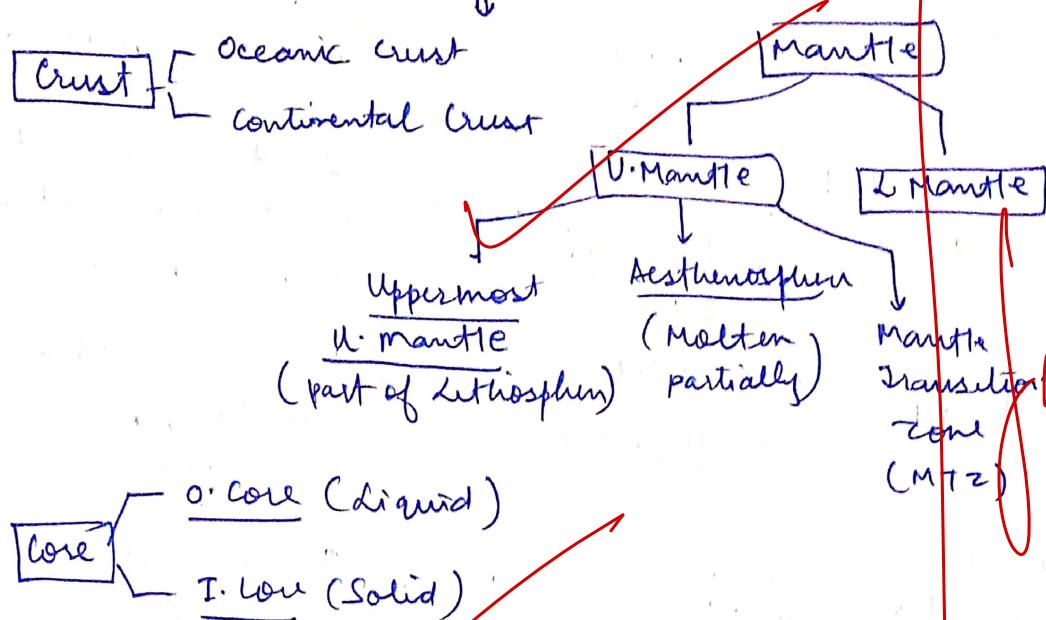
Earth's interior



Remarks

Role of seismic waves in studying interior.

- * Helps in categorisation of various parts



- * Studying the nature of Earth's interior layers

(eg)

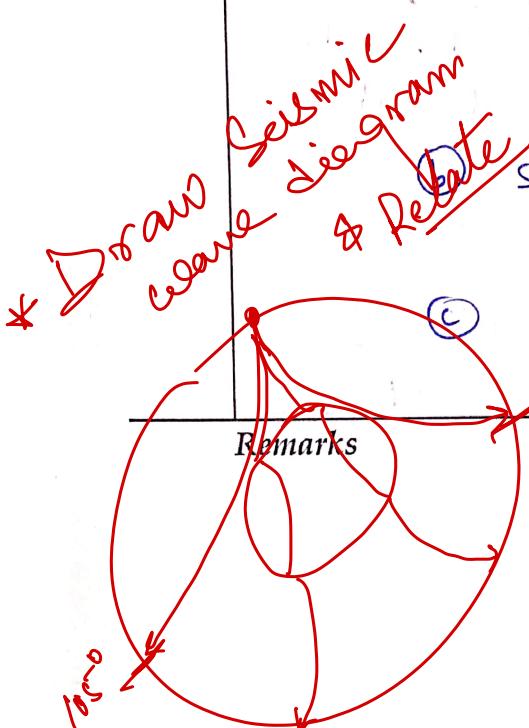
- Velocity change
- Direction change
- Magnitude change

} detail about discontinuities & physical condition

(eg) \Rightarrow a Sudden decrease in velocity of P-waves at core-Mantle boundary \Rightarrow Partially molten Aesthenosphere

Sudden stop in S-waves at I-core \Rightarrow Liquid state

Increase in velocity at I-core \Rightarrow Solid state of the core.



\Rightarrow Shadow zone for P wave

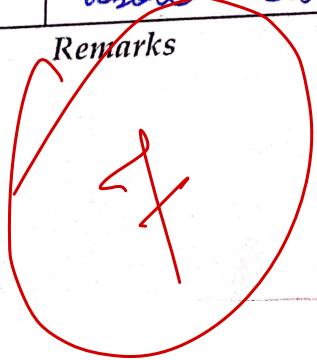
* Write role of these waves in defining density.

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	Composition	density	Structural properties
Continental Crust	<u>Rocks</u> - Andesitic & Granitic <u>Minerals</u> - Silica Alumina	2.5 g/cm ³	Solid, thick under mountains (100 km) Normally 40-60 km
Oceanic Crust	<u>Rocks</u> - Basaltic <u>Minerals</u> - Ferromagnesian	3 g/cm ³	Solid, dense and floats over molten asthenosphere
Asthenosphere	<u>Rocks</u> - Peridotite <u>Minerals</u> - Olivine	4.5 g/cm ³	Partially melted. Velocity of p-waves slow here
Mantle Transition zone	Same (Solid)	5.5 g/cm ³	No sudden change
Lower Mantle	<u>Rocks</u> - Gabbro <u>Minerals</u> - Olivine	6 g/cm ³	High temperature. High velocity zone (HVR)
Outer Core	<u>Mineral state</u> Ni, Fe = major (57%) (88%) Ions	9 g/cm ³	Temperature so high that rocks melt & pressure also increases (Molten state)
Inner Core	<u>Mineral state</u> (Ni, Fe) - Solid state	13 g/cm ³	Solid state & mineral temperature & pressure

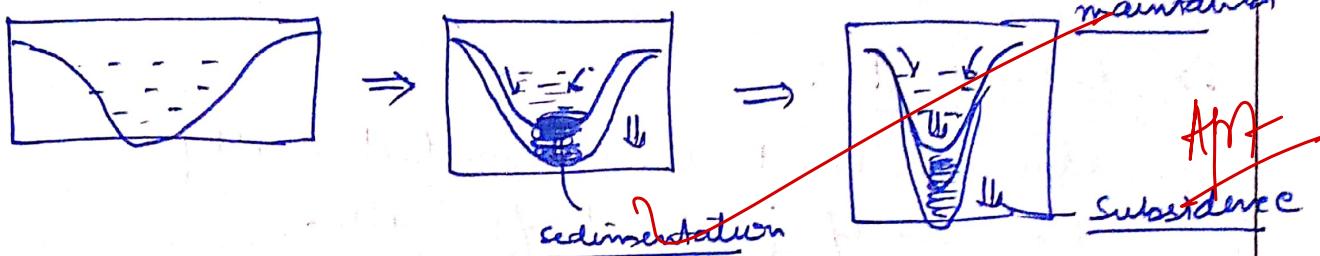
Thus, seismic waves detail the geologists about earth's crust through above examples.

Remarks



2. (c) Discuss the theories and models proposed to explain the formation of geosynclines. Compare and contrast the accretionary prism and back-arc basin models in relation to geosyncline development. (250 Words) (20)

~~fine~~ ~~In H2O~~ geosynclines are long, narrow and shallow waterbody formed due to subsidence of bottom which form the cradle of ancient & young fold mountains.

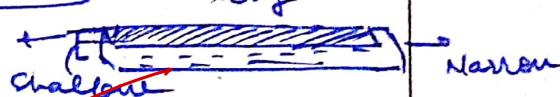


~~fair~~ While studying fold mountains, marine sedimentary rocks and fossils of marine organisms were found on its surface which led to the study about Geosynclines.

Various scholars & their theories

1) Hall and Dana:

~~Hall~~ → studied Appalachian Mountains
Dana while studying it, he claimed that

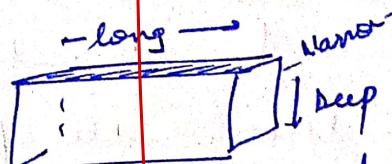


Geosynclines are long, narrow & shallow water bodies creating fold mts

Hall was my assistant who later elaborated the relationship between them

2) E. Haugg:

claimed Geosyncline were long, narrow and deep water bodies.



3) Schuchert:

claimed that there existed multiple processes of fold mt formation.

Appropriate

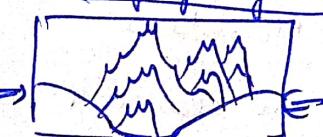
(a) Mono geosynclines - Long narrow & shallow geosyncline with one process of orogeny



(b) Bi-geosynclines - long ~~as wide~~ & shallow geosyncline with at least 2 processes of orogeny



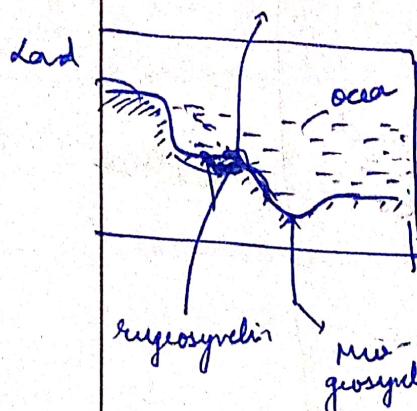
(c) Poly geosynclines - very long, narrow and deep geosyncline with multiple orogeny processes



Remarks

1) Stille:

Latin completely worked the concept of Geographical study.



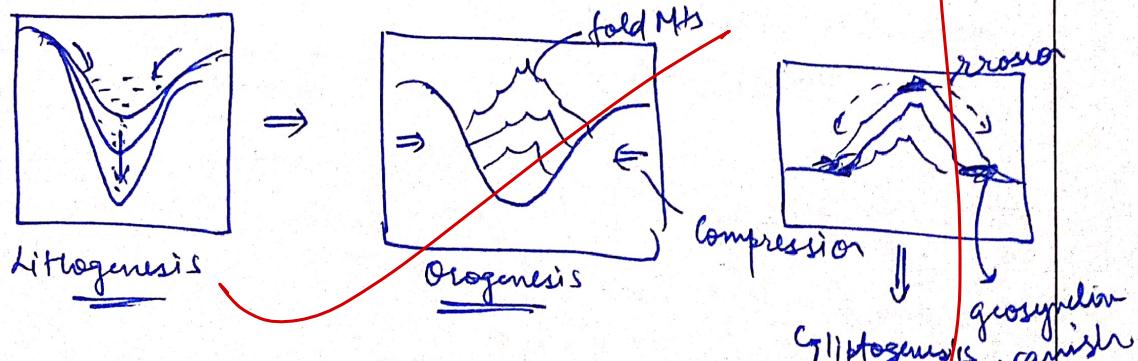
He claimed Geosynclines are bound by Land on one side & oceans on other

& there existed a basement rock in between

He renamed it Geoclinal

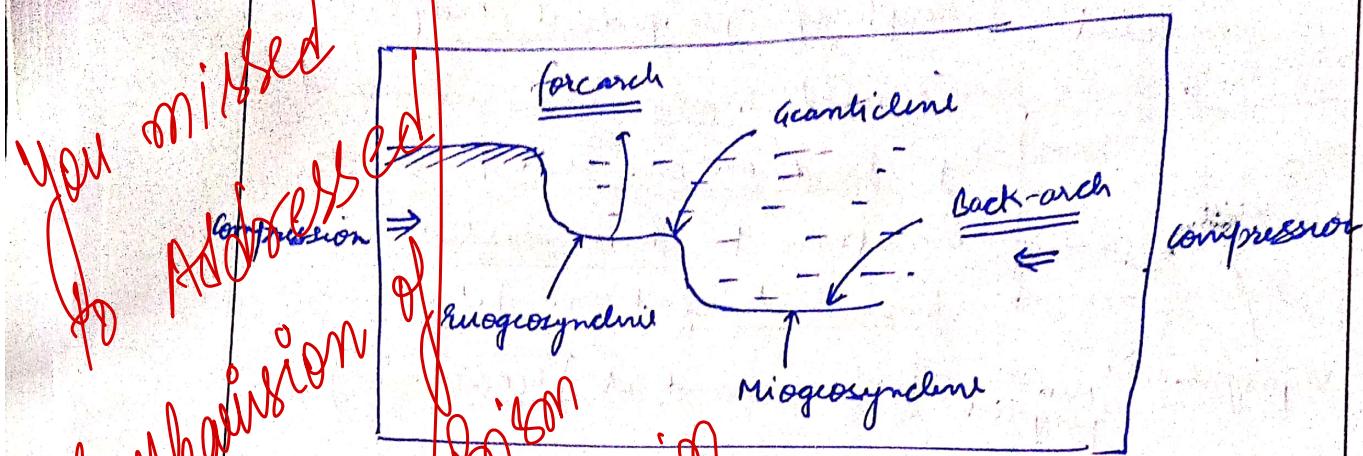
A general process of transformation of geosyncline into fold mountains contain 3 fold process

- ① Lithogenesis - preparatory stage (Geosynclinal)
- ② Orogenesis - compression occur (mountain form)
- ③ Gliptogenesis - erosion of top occur and existence of geosynclines is eroded



Remarks

Stille's Back-arch & fore-arch model

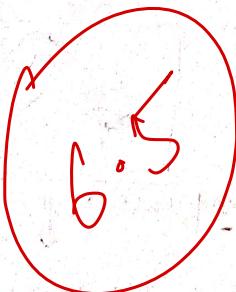


You missed
so Add
Compression
of
Miogosyncline
In this model \Rightarrow Geosyncline = Geocline
Accretionary prism
and Bank all Basin
when compression occurs
the sediments get folded
into fold mountains unevenly.

Land on one side
Ocean on other

divided
by raised basement
of ge-anticline

Conclude with
significant role
in geological
histories of Earth.



Remarks

3. (a) Analyse the processes of convection and mantle dynamics in the Earth's interior. Discuss how mantle convection drives plate tectonics and influences the geological features on the Earth's surface. (200 Words) (15)

~~Deleted part~~

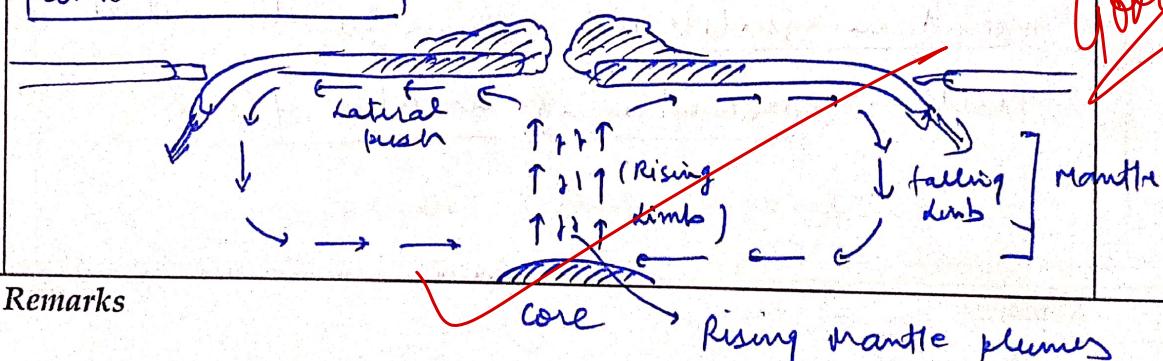
Convectional current theory was proposed by Arthur Holmes which was further used by Harry Hess in his sea floor spreading theory to explain the processes of convection and mantle dynamics.

Bouvier's cycle is an important process which drives the magma differentiation in the mantle creating various differences.

Acc. to Harry Hess / Arthur Holmes:

Source of energy driving Mantle plumes \Rightarrow Primordial heat - stored within crust. Radioactive decay constantly occurring within ~~core~~ core

Convection process:

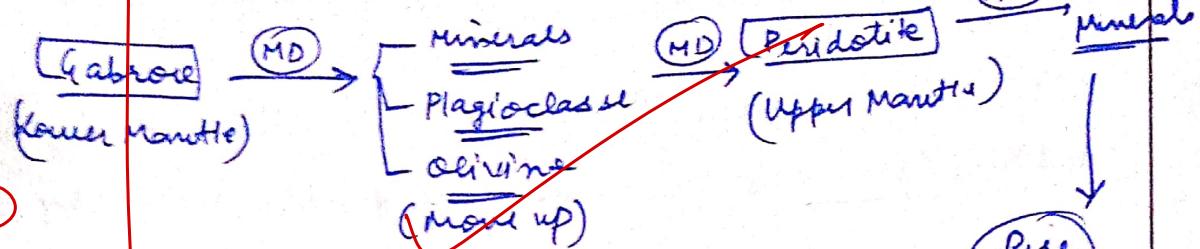


Remarks

Rising mantle plumes

Plate Tectonics & Mantle Influence

Initially molten rocks: (Asthenosphere)



Rising limb

Molten rocks in the form of rising

parts of thermal convection current (TCC)

Falling limb

more up and meet the prevailing oceanic crust into 2 parts - later more spherically under influence of plates applying later pull stretching breaking them apart.

Well

later, after some distance they cool and subside in form of falling limb of TC pull the other end of plate with it.

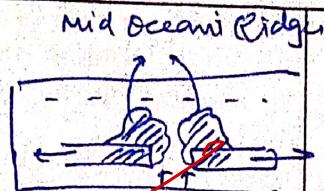
* You will see the fallen limb of magma, in order to maintain equilibrium return to its initial position maintaining circular flow.

Mantle

Hotspot activities

Influence creating landforms:

1) At Diverging plate boundaries:

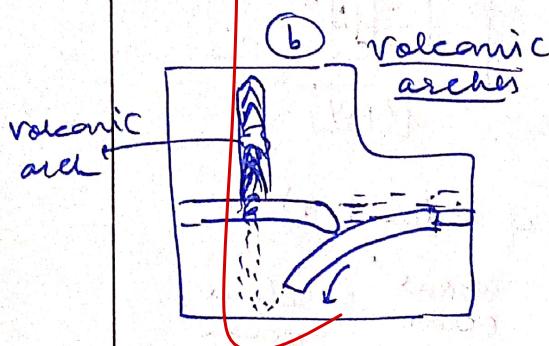
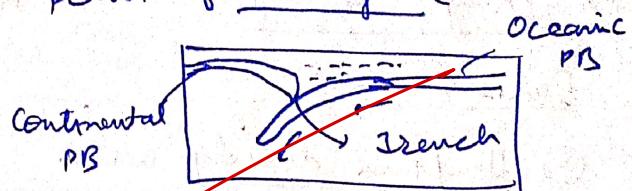


Create Mid-Oceanic Ridges - longest continuous chain of ranges beneath mean sea level

(e.g.) Mid-Atlantic Ridge

2) At converging plate boundaries:

a) Trenches = point of convergence



- subducting plate meets & sub. creating volcanic arch by melting the continental crust due to lighter silica

→ due to Mantle Plumes

c) Sea mounts & hot spots create mid-ocean volcanoes (e.g.) Hawaiian volcanoes

Thus, PTT and Convection Current of mantle are interrelated & part of same process creating explaining various geomorphological features

Remarks

3. (b) Discuss the concept of Airy and Pratt isostasy and their differences. Explain the fundamental principles underlying each theory and how they contribute to our understanding of isostatic adjustments. (200 Words) (15)

Iostacy is a state of balance created between upstanding mountain and downtrodden valley on a rotating earth surface.

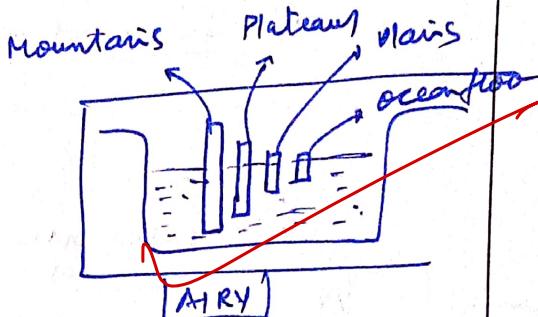
Various theories

1. > Airy's concept

Basis:

- ~~a) Uniform density with various depth;~~

~~b) Law of floatation:~~



Airy postulated that continental features created of solid SALT float over water like ice.

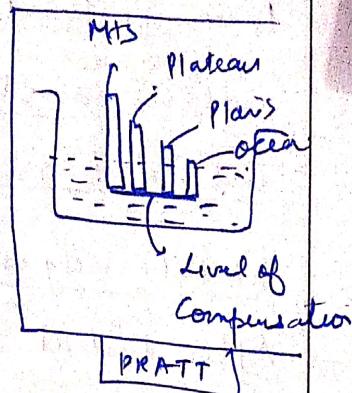
Criticism: Himalayas - so deep root such that it may melt under such high temperatures.

Remarks

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In comparison: Pratt's TheoryArchelon Pratt based it on:

- (a) Uniform depth with varying density (found true in reality)
 - (b) There exist a line of compensation up to which density varies but sophisticated beneath it density becomes uniform.
- Crossed out*



He postulated there existed different density

$$\text{density} \propto \frac{1}{\text{Height}}$$

for each feature.

* Could Add
 → principle of
 gravitational equilibrium
 (thus, these 2 theories trying to explain same
 thing differ in concepts with each having
 few criticism.)

(Hutton's Real theory).

He merged the above two concepts:
 therefore Varying density & Varying depth \Rightarrow true

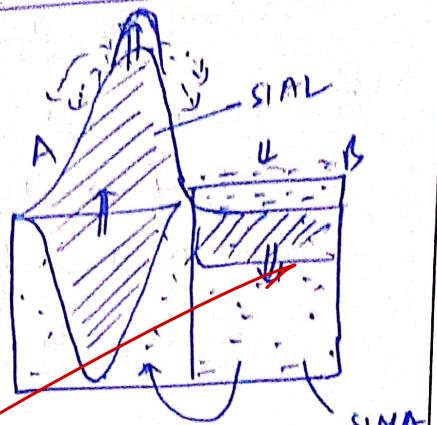
Remarks

NOT
required

~~Air~~ Airy's postulate is closer to reality since it explains isostatic readjustment occurring at Iceland & Greenland & Scandinavian countries

Isostatic adjustment:

After initial tectonic uplift, Mts later erode at top and should ideally diminish in size.



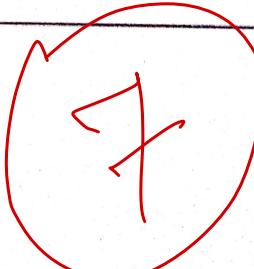
~~Air~~ But eroded material collects our oceans which pushes the SIMA down. In order to maintain equilibrium it moves over SIALIC magma chamber to push the Landform up

⇒ Landform A does not go up until the force of viscosity is exceeded by upward thrust.

⇒ Hence, stone rise in landforms is seen over Scandinavian countries.

~~Air~~ Even scientists claim that Rise of Himalayas could also be attributed to isostatic readjustment.

Remarks



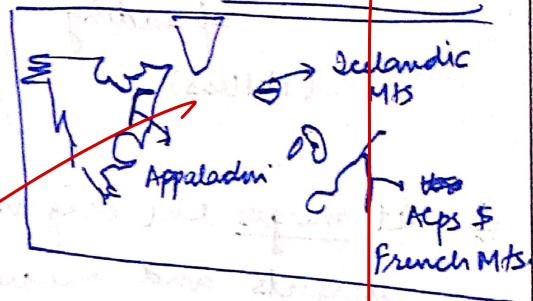
3. (c) Analyse the evidence supporting the theory of plate tectonics. Discuss the geological, paleontological, and geophysical evidence that led to the acceptance of plate tectonics as a unifying theory in Earth sciences. (250 Words) (20)

~~Wilson, Morgan and Mackenzie~~ in 1965 deduced that ~~static continents~~ are floating over ~~molten~~ ~~SIMA~~ via a ~~thin, rigid slate of landmass~~ called ~~Plates~~. Thus emerged the concept of Plate tectonic theory.

Evidences supporting the theory of Plate Tectonics

① Transverse mountains on the ~~northern~~ coast

② Rocks of same ages on both coast of ~~moved~~ tectonic plates

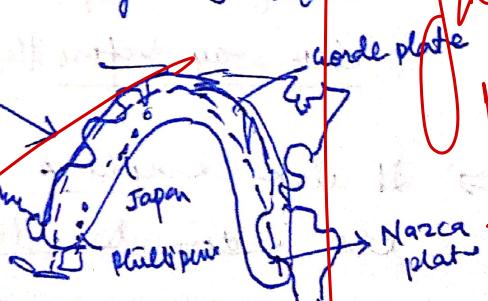


③ Occurrence of ~~Earthquakes~~ along ~~Ring of fire~~

↪ Circum pacific Belt

Highly active zone

Seismic volcanic island arcs
\$ Kerela



Remarks

④ Presence of plate boundaries

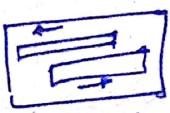
(4)



Divergent PB
Mid Atlantic Ridge



Convergent PB
Pacific plate
Eurasian plate



Transform Plate Boundary
Arabian plate
Eurasian plate

⑤ Satellite imagery - approximately 100+ plates detected

⑥ JOIDES, USA

~~100+~~

Plate tectonics - a unifying theory

Sea-floor
Spreading
(H-Hess)

Continental
Shift
(A-Wegener)

Convection
current
Theory
(A-Holmes)

⇒ It merges the origin of Thermal convection currents and movement of plates.

⇒ It accepts the movement of continents not just beyond Cambrian period but also way before that (Wilson cycle)

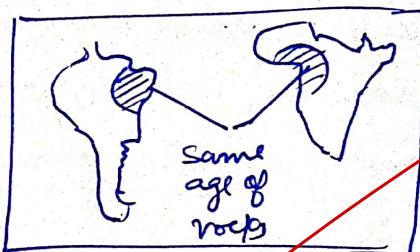
⇒ It also explains the age of oceans and the sediments deposited over it.

Remarks

4.

geological evidences :

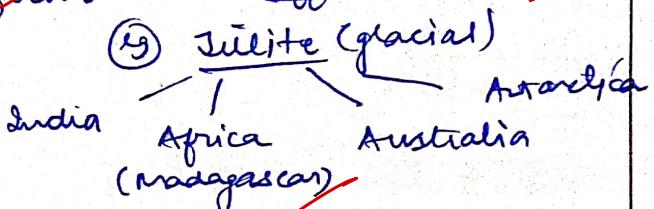
1) Age of rocks around Brazil & western Africa



* jig saw fit

2) Same rocks found on different continents

(Paleoclimatic) evidence



3) explanation of Caldonian & Hercynian mountains.

Geophysical evidences :

1) Volcanoes along convergent plate boundaries

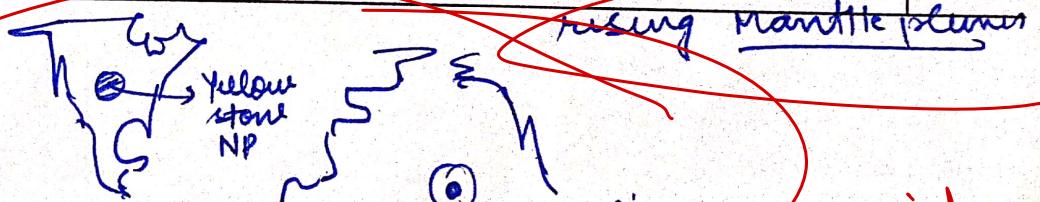
2) Trenches along convergent plate boundaries (CPB)
(Continental & oceanic)

3) Presence of fold mountains around CPB.

4) Mid oceanic ridges along diverging plates

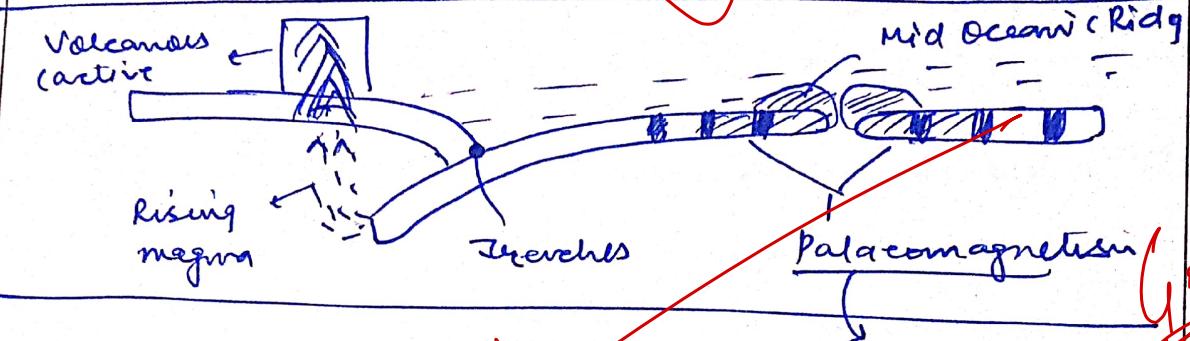
5) Hotspots in middle of plates \Rightarrow Acceptance of random

Remarks



Paleontological evidences:

- 1) Age of rocks equidistant from mid oceanic ridge = same.
- 2) Presence of magnetic inclination of same direction (Paleomagnetism) on coast
- 3) Sedimentary absence over mid oceanic ridges
- 4) Rock's width decreases from mid oceanic Ridge to trench



Age of
Rocks

(Magnatism)

Wilson
Matsuyama
Cairns
Gilbert

Thus, Plate Tectonic theory successfully explains various anomalies in earth's crust and surface functions. As the study about earth's interior evolves, our understanding about these phenomenous modify

Remarks

Q

4. (a) Discuss the role of paleomagnetism in confirming the theory of continental drift. Explain how the alignment of magnetic minerals in rocks provides evidence of past continental positions. (150 Words) (10)

~~Jine intro
would define
Paleomagnetism~~

continental drift theory of Alfred Wegener got its real support when Paleomagnetism via sea floor spreading theory (SFS) of H. Hess was put forth.

Paleomagnetism confirming CDT:

- 1) Polar wandering:- It's not the magnetic poles that vary, but it's the continents themselves that undergo movement. *I need to explain in more detail*
- 2) Sea floor spreading - Magnetic tape recorder: Reason for continental movement is slab push & pull originated due to Rising mantle plumes.
- 3) Age of rocks along the different continents and magnetism preserved in it indicate continental drift. *Jine*
- 4) An irregular cycle of magnetic pole reversal in contrast to regular movement of continental plates

Remarks

Paleomagnetism phenomenon

As the magma upwells, it cools and solidifies according to the prevailing magnetic field. The Iron & Nickel grains in the rock indicate the magnetic field of ancient times.

Studying :

- ① Magnetic inclination & declination over different rocks in different continents across ages:

Result :- Different magnetic poles

There exist different Polar magnetic wandering curves

- ② If rocks of same ages of across diff continents are studied \Rightarrow one Polar wandering curve must be visible

Not so \Rightarrow therefore geologists deduced that it is not magnetic poles that wander but it is the continents themselves.

Thus Alfred Wegener's COT got a boost in study of Paleomagnetism.

Remarks

Conclude with
comprehension in Understanding
of Earth's phenomena.

3.5

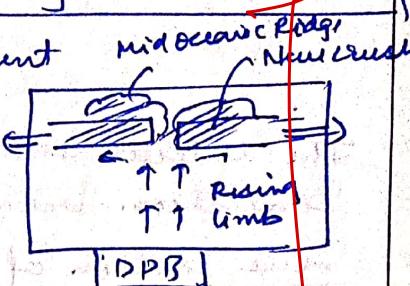
4. (b) Analyse the role of divergent plate boundaries in the formation of new crust. Discuss the process of seafloor spreading, mid-ocean ridges, and the creation of oceanic crust. (150 Words) (10)

~~Could directly affect~~

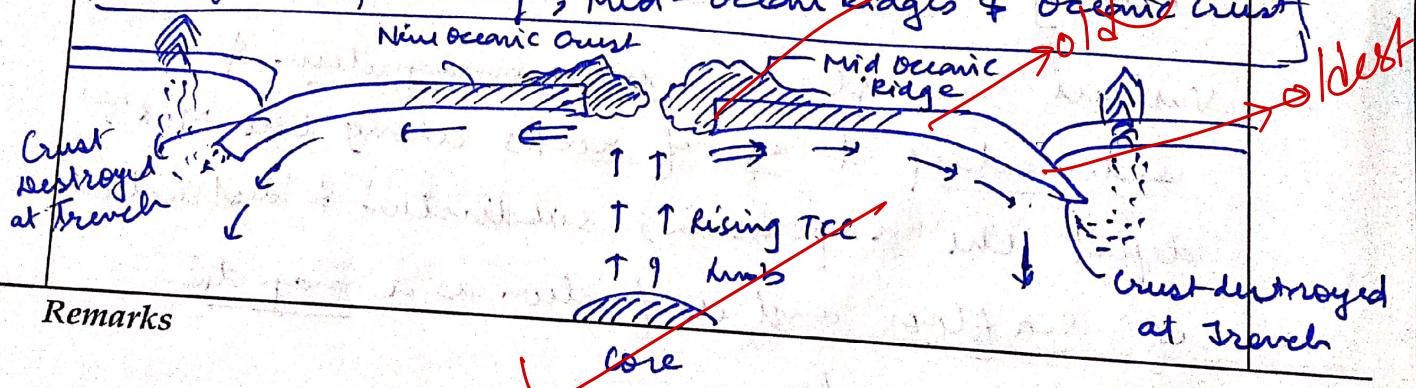
~~Plate tectonic theory propounded that various plates converge which destroy crust and various plates diverge leading to the creation of crust.~~

~~Role of Divergent Plate boundary in new crust~~

- * Roll of Thermal convection current at the diverging boundary
- * Attaching magma at trailing edges of the oceanic plate
- * Lateral movement of oceanic plate due to magmatic pull
- * Thus newly formed oceanic plate (basaltic) moves laterally regularly and creates new oceanic crust.



~~Sea floor Spreading, Mid-ocean ridges & Oceanic crust~~



Remarks

Process of Sea Floor Spreading - H.Hess

~~Due to primordial heat & radioactive decay~~

~~Thermal convection~~

~~current (TCU) in form of mantle plumes~~

~~Propel up along diverging~~

~~plate boundary and~~

~~accumulate forming Mid oceanic ridges~~

~~(long chain of mountains along Boundary point)~~

The lateral thermal convection brings new portion of attached magma

~~thus regular creation of new oceanic crust at~~

~~the boundary takes place~~

~~leading to lateral shift~~

Thus, this process continues & sea floor spreads

ultimately \Rightarrow Near trenches, this floor (oceanic) crust gets subducted and destroyed

making net oceanic crust constant.

Various examples of palaeomagnetism & sedimentary & age of rocks along the M.R's depict the expansion, subduction & destruction of sea floor and its function as a magnetic

Remarks

tape recorder

Avoid

* fair Conclusion

4. (c) Discuss the concept of landscape development and its significance in understanding the formation and evolution of Earth's surface features. Explain the processes and factors involved in shaping landscapes. (150 Words) (10)

~~W.M.Davis in 1899 in 'geographical cycle of erosion'~~
~~told that landscape of any region is a function of structure, process and time~~
~~and Penck's "morphological evolution" too supports that landscape development has evolved significantly due to various forces acting on it.~~

~~Hutton too via his uniformitarianism explained that landscape development occurs as a result of various geographical forces.~~

~~significance in understanding evolution~~

- ~~1) Helps understanding various erosional surfaces~~
- ~~2) Study of slope development becomes easy~~
- ~~3) Processes shaping landscape comes to fore~~
- ~~4) Regions of uneven topography gets exhausted~~
- ~~5) Processes, (Erogenic & Endogenic) are revealed~~

~~Remarks~~

Process involved in shaping landscape

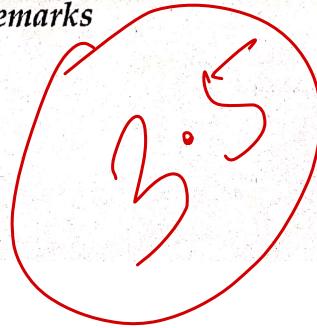
- 1) Endogenic processes - force from within earth's interior
- 2) Exogenic processes - force from sun in form of various physical features

Factors of landform development

- 1) Structure of rocks - Metamorphic, Igneous and size of its structure etc.
- 2) Erosion, Weathering, Climate change, Altitude, Size of particles etc.
- 3) Flexibility.
- 4) Solubility of rocks.
- 5) Prevalent physical features.
- 6) Relief v-e gravitational impact

Thus, various landforms develop due to dynamic equilibrium maintained between the 2 processes mentioned above

Remarks

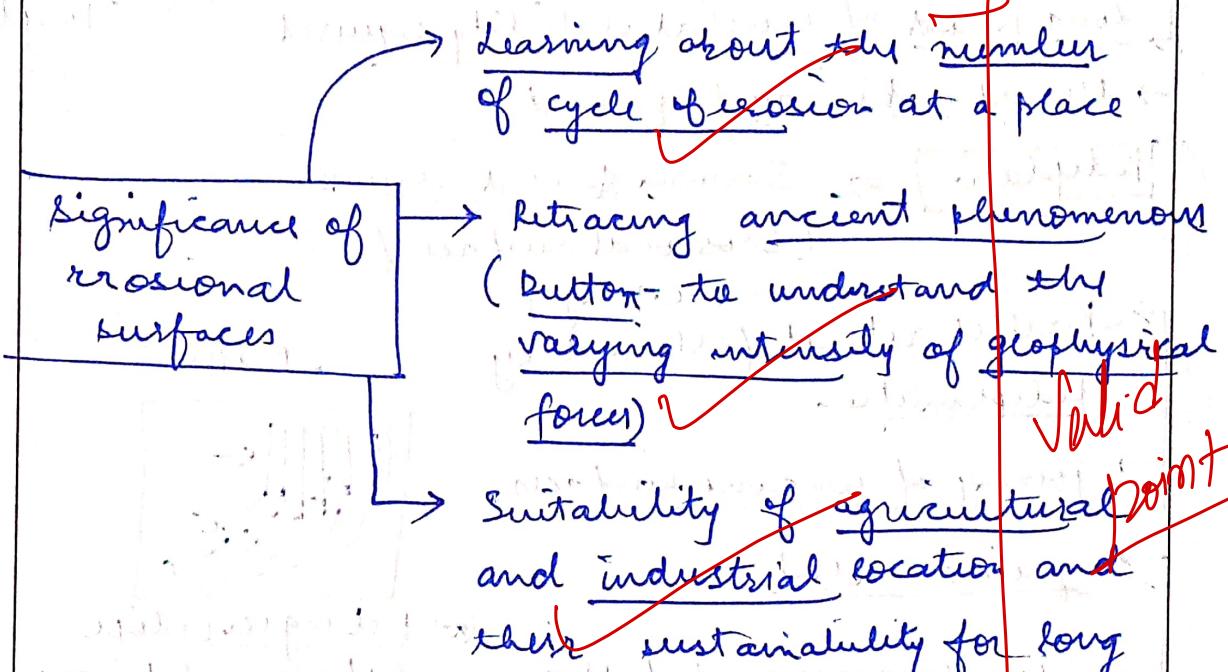


* Conclude with importance in making land use planning & development.

4. (d) Discuss the concept of erosional surfaces and their significance in understanding landscape evolution. Explain the formation and characteristics of erosional surfaces, including peneplains, pediplains, and etchplains. (150 Words) (10)

~~line
start~~

Erosional surfaces are faint relief produced due to long period of cycle of erosion due to which a slightly graded concave surface is produced.



Formation of erosional surfaces & Characteristics

- 1> Long period of ^{crustal} stability (No endogenic forces)
- 2> Initiation of exogenic forces of varying intensity (Running water, wind)
- 3> Strength of exogenic forces.
- 4> Long period of stability followed by no concurrent

Remarks

reappearance of rejuvenation like phenomena

Avoid

Peneplain - W.M. Davis's erosional surface (temperate regions)
faint relief

- concavo-convex surface

- formed due to downwasting

→ long period of crustal stability required

→ Monadnocks may be present

Pediplan → Savanna & arid regions

(Erosional surface of L.C.icing)

→ Periodic retreat followed by pediplanation

→ joining of concave surfaces

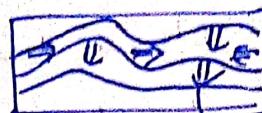
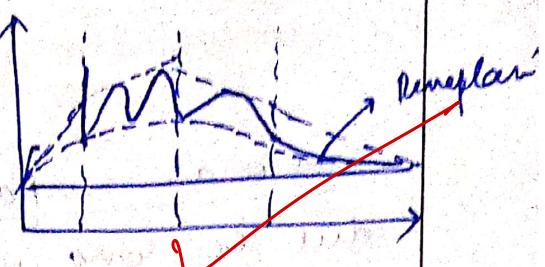
→ graded relief

→ slightly more graded than peneplain

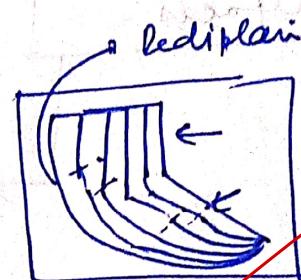
Add

* You missed to add

Etchplains.



peneplain



① rectangular steps
existing & taken over by concavity

② after that concavity takes up steep face

③ merging up of several pediplains - Pediplanation

Remarks

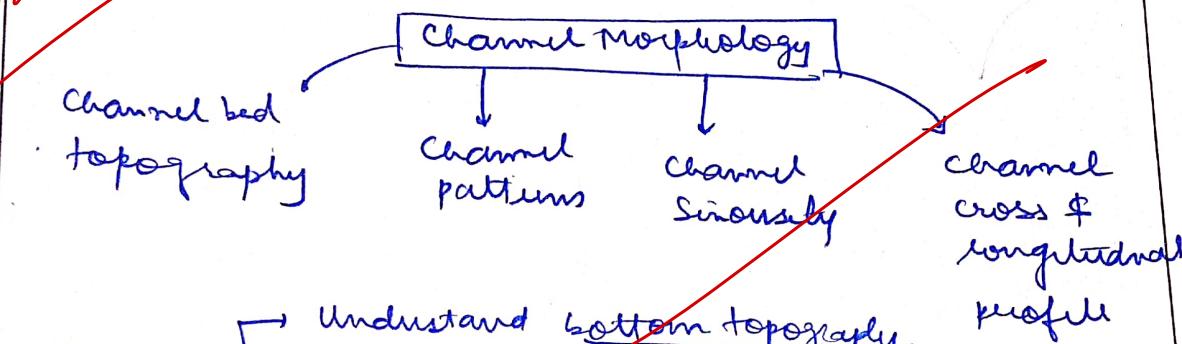
3

* Conclude with hydrologic evolution & planning

4. (e) Discuss the concept of channel morphology and its significance in understanding fluvial processes and river behavior. Explain the characteristics and classification of different types of channels based on their morphology. (150 Words) (10)

~~Definition~~
~~Significance~~
~~Classification~~

Channel Morphology can be defined as the study of cross-section or longitudinal section of a channel bottom, channel pattern or channel sinuosity in varied forms.

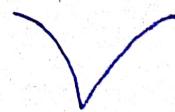


* Discuss Significance
 then
 Classification with Characteristics
 → straight
 → meandering
 → braided
 → transforming

Discuss with characteristics

Remarks

Different types of channels



* Conclude with
its importance
in Infra development

Remarks

1.05

5. (a) Discuss the causes of earthquakes and the factors influencing their occurrence. Explain the different types of faults, including transform, convergent, and divergent boundaries, and their role in generating seismic activity. (200 Words) (15)

~~Delhi Earthquake~~

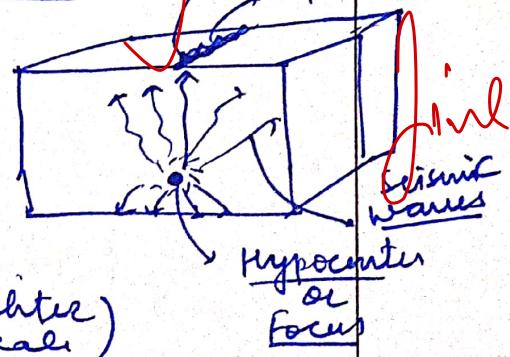
Earthquake is defined as the vibrational disturbance caused in the earth's interior disorienting the long-maintained geo-static equilibrium of transitional nature.

Causes of Earthquake :

- 1) Collapse earthquake - Due to building or dam collapse
- 2) Rewire induced quake - Due to dam nearby
(e.g.) Karnal Dam Quake
- 3) Plate movements and division, Subduction or transform passage (Plate Tectonics)
- 4) Anthropogenic quake → Oil extraction
→ Mine Blast → Fault created epicenter

Factors influencing :

- ① Rigidity of Plates
- ② Amount of energy released
(Measured via Richter scale)



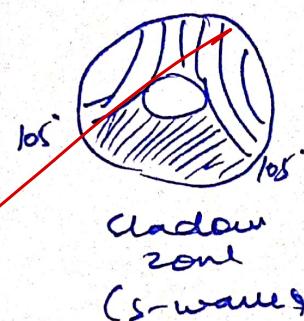
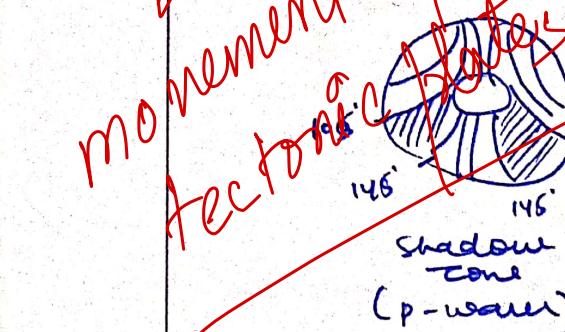
Remarks

~~PDF Eraser Free~~

③ Flexibility of plates (e.g. H. F. Reid's elastic Rebound Theory)

④ Strength of structure and interior density

⑤ Area present on the surface

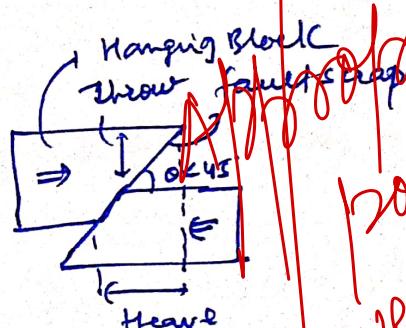


Different Types of Faults :

Faults are fracture created on earth's surface due to radial forces acting on the point

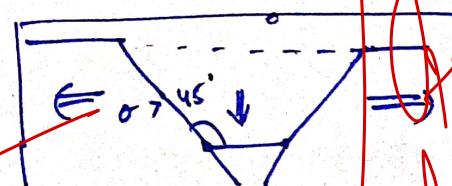
a) Reverse Fault / Thrust fault

- $\theta < 45^\circ$
- Throne > Heave
- Compressional forces act
- Hanging block over Basal block



b) Normal fault

- $\theta > 45^\circ$
- Throne < Heave



Remarks

- Tensional forces
- Hanging block throw

Include

* Strike slip fault

Avoid

Appropriate point
However you missed
go discuss related Earthquakes

\Rightarrow Transform fault

(e.g) Californian fault

(San-andreas
fault line)

High intensity
quake \Leftarrow [creep]
 \Leftarrow [friction]
 \Leftarrow
of
shallow depth

\Rightarrow Convergent fault:

(A) - Thrust fault

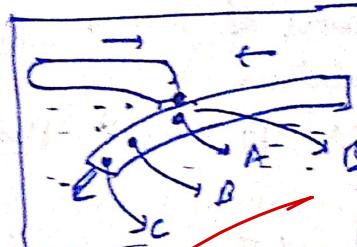
[high intensity
shallow foci]

(B) - Normal fault

- low intensity, intermediate foci

(C) - Normal fault

least intensity, deep foci felt way
beyond the subduction point



\Rightarrow Divergent fault:

high ~~intensity~~ intensity

shallow focus earthquake

(e.g) Atlantic quakes along M.R.

A.P.T

These earthquakes are a significant force of

Remarks nature which needs to be studied further

6.5

ANOTC

5. (b) Discuss the concept of denudation chronology and its significance in understanding the sequence of landscape evolution. Explain how the analysis of denudation chronology contributes to the understanding of erosion, weathering, and other denudational processes. (200 Words) (15)

~~Junk
Info~~

Denudation chronology is the reconstruction of past erosional surfaces based on their current appearances.

Identifying erosional surface

Methods of denudation chronology

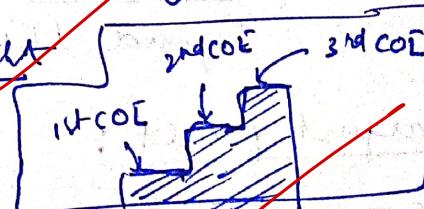
Field checks

Histogrammic & Height correlation

Aff

Palimpsest Topography forms an important part of understanding the denudational topography.

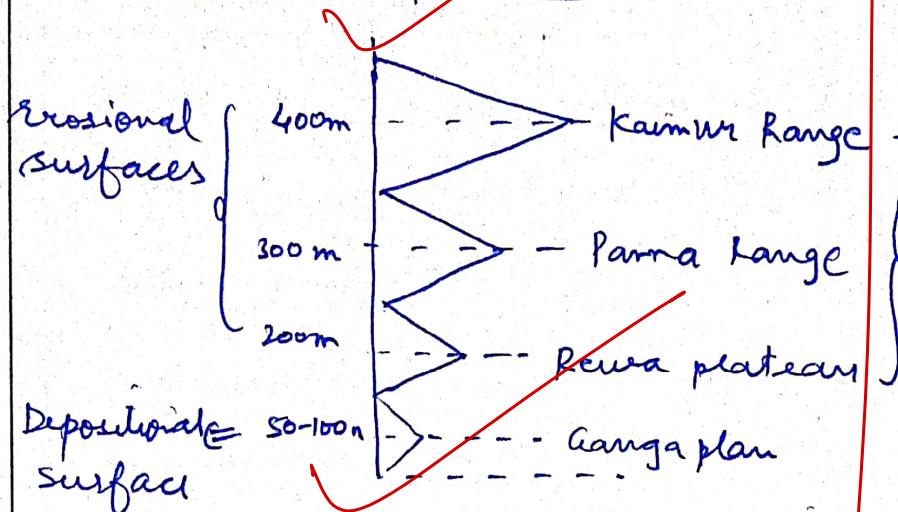
Various cycles of erosion occurs in any one surface due to which the surface may be found at at great height.



Example of Allahabad's Belan valley's denudational chronology was studied on the basis of palimpsest topography.

Remarks

~~4 levels of erosional surfaces were found of which 1 was depositional.~~



You discuss

deduced erosional surfaces

erosion rates

found using Altimetric lithostratigraphic superposition

(deduced surface) \leftarrow Field checks

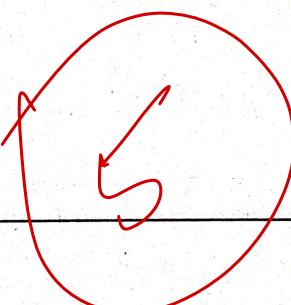
(Reason for raised valleys) \leftarrow Height correlation

Thus analysis was later made using field checks & height & relief comparison.

W after
and others
deposition
processes

* Conclude
with its application

Remarks



* Answer needs more descriptive analysis

Remarks

- * ~~Start with geomorphic cycle~~
5. (c) Discuss the theories of geomorphic cycles proposed by Davis, Penck, and King. Explain the key components of each theory and how they contribute to our understanding of landform development. (250 Words) (20)

Davisian cycle of erosion has been based on sequential transformation of the surface through place, process, time and structure via youth, mature and old.

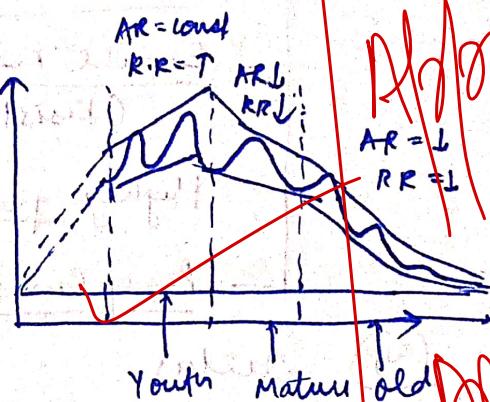
He mixed Darwinian & Dutton's concept to give his own understanding about geomorphic cycle.

Stages of Davis:

Initially \Rightarrow slow rapid

upliftment for small time

\Rightarrow No erosion with upliftment



Youth Stage: $A \cdot R =$ constant (Absolute Relief)

$R.R =$ increase (Relative Relief)

Valley deepening is strong

V-shaped valley emerge

Landscape - gorges, canyons, cascades, etc

Mature Stage: Both $AR =$ less / $RR =$ less

Remarks

- Valley deepening slows
 - Valley widening is fast (lateral erosion)
 - V-shaped → U-shaped valley
- (eg) Meanders, levees, flood plains

Old stage:

- AR = L
 - RR = L
 - Valley widening fastens
 - watersheds eroded
 - Small residual strong monadnock (Resistant) originate
 - Highly graded convex-concave plane
 - Peneplain emerges
- (eg) Deltas

ValidWorn

Walther Penck's Morphological system

Rejected Darwinian time dependent cycle.

Stressed more on process & forces applying on it

3 phases

⊗ Initially → It has no upliftment for short period, rather upliftment & erosion is simultaneous

Remarks

(Krimmung)

I Aufstigende Entwicklung (Phase of Uplift)

Initial slow, later rapid
upliftment

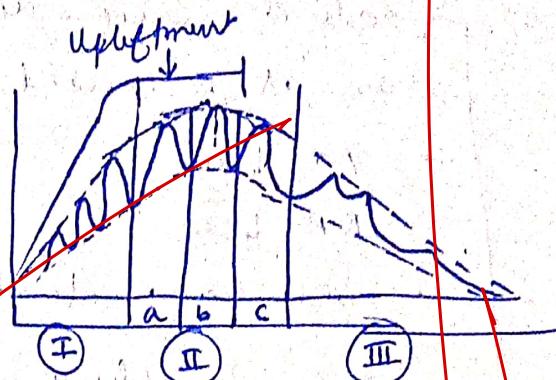
erogenic force start acting

valley deepens

Valley Bottom Risi

A.R. ↑

R.R. ↑



II Gleichförmige Entwicklung (Phase of Constant Erosion Rate)

3 stages in it: \Rightarrow each stage - $|R.R. = \text{constant}$

(a) A.R. \approx 0

valley deepening happens

valley bottom also rises (upliftment)

(b) $A.R. = \text{constant}$

\wedge summit erosion = Upliftment

valley deepening slows

erogenic forces speed

valley bottom rise = constant (do not rise)

(c) Upliftment stops

A.R. = 0

valley bottom falls

lateral erosion emerges

Remarks

(III)

Ausbildende Entwicklung

lateral erosion dominates

summit is lowered

AK ↓ see

RR ↓ see

Holdenhang extends to replace ~~Boschenhang~~ (slope replacement from)once Inselberg is produced, downwasting occursEndriempf occurs - extensively graded

MFT

Below

Boschenhang

* You missed it

processes

cycle of erosion

summital concavity

scarp

debris slope

* icing cycle

diagram



Remarks