

**GS Advanced Program 2023****Generic Booklet**Test Name/Code/No. : 691046

Name			
Email ID.			
Roll No.			
Mobile No.		Date	

Allotted Time : 60 Minutes**Instructions to Candidates -**

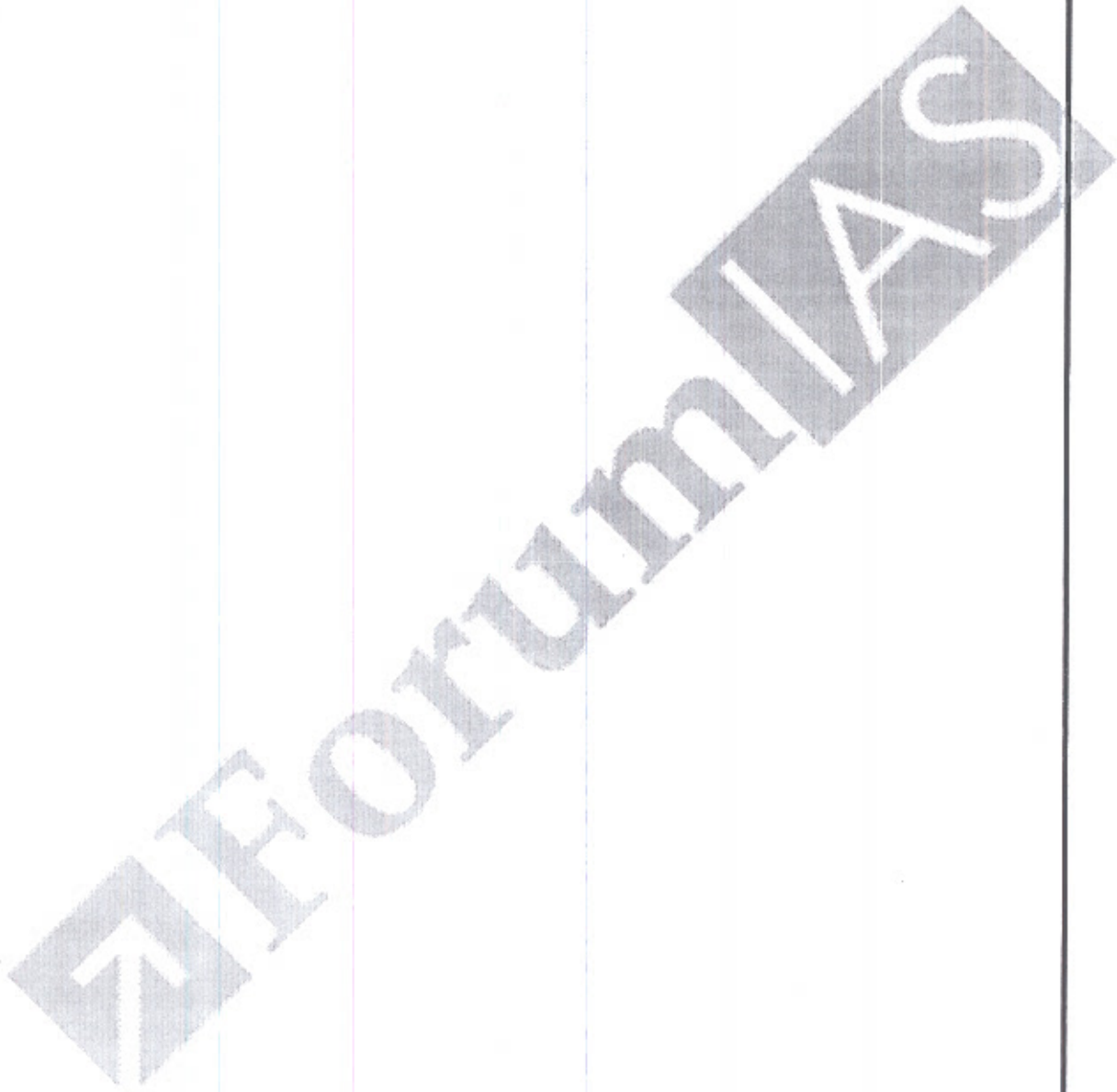
- There are 7 Questions in this Question paper.
- All Questions are Compulsory.
- For all updates, please visit the noticeboard - <https://noticeboard.forumias.com/gsap-2023/>

Important -

- Answers must be attempted in the QCA Booklet only.
- To upload the Answer Copies please visit to "My Course" section on - <https://academy.forumias.com/>
- Only those copies will be evaluated which will be submitted before the next class.

Q. No.	Grade/Score
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Overall Grade/Score	

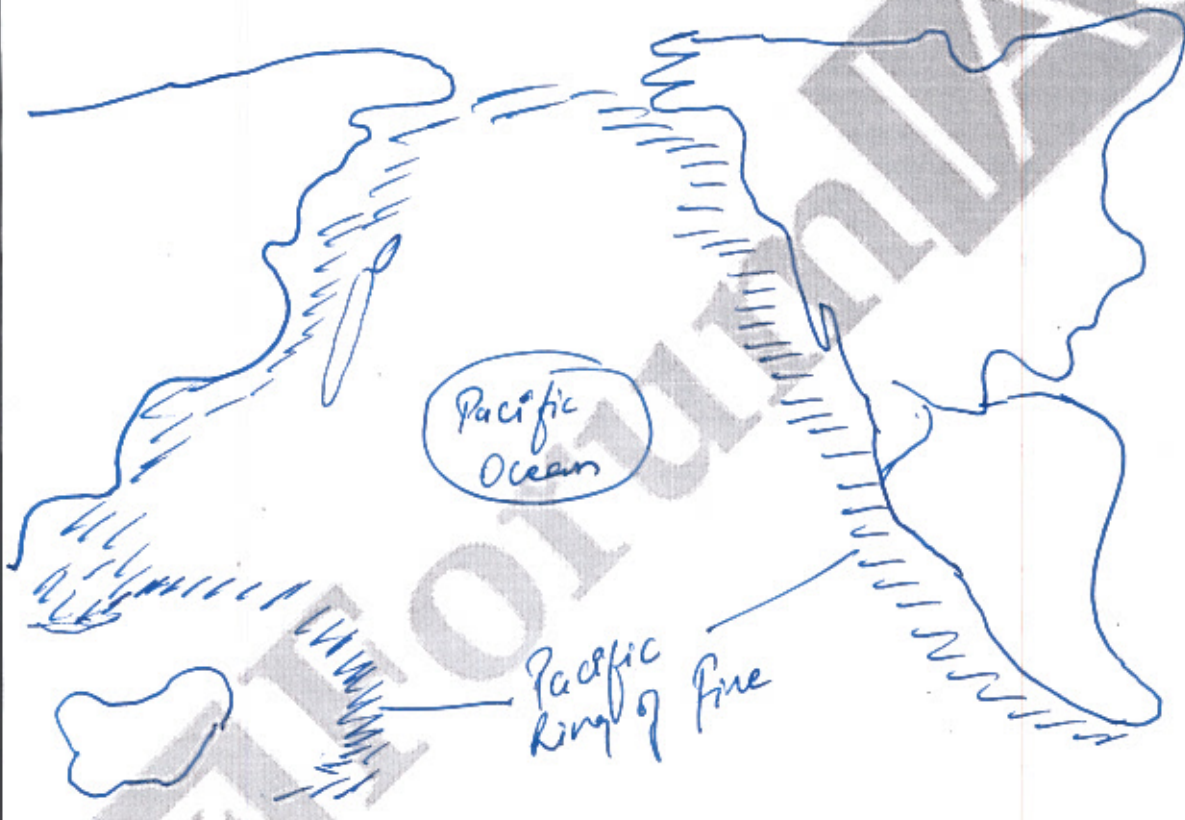
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Q.1)

The Circum Pacific Zone, also referred as The Ring of Fire is a path along the Pacific Ocean which is characterised by volcano and frequent earthquake.



Geophysical characteristics.

- ① Location - Located around Pacific Ocean covering parts of Europe, Asia, Australia, South and North America.

- ② Volcano Eruptions → major characteristic feature
 ↳ consists of nearly 75% of earth's volcanoes
 ↳ eg: Recently volcano eruption at Tonga Island.
 ↳ Mount Fuji of Japan
- ③ Earthquakes → eruption of volcanoes are also characterised by frequent earthquakes
 ↳ eg: Japan high freq. eq.
- ④ Formation of landforms - volcano eruptions lead to formation of Islands, mountains etc.
 ↳ eg: Aleutian Islands of Japan, Mount Fuji
- ⑤ Formation of hot spots - Ring of fire is ~~hot spots~~ home to hot spots
 ↳ eg: Hawaii Islands.

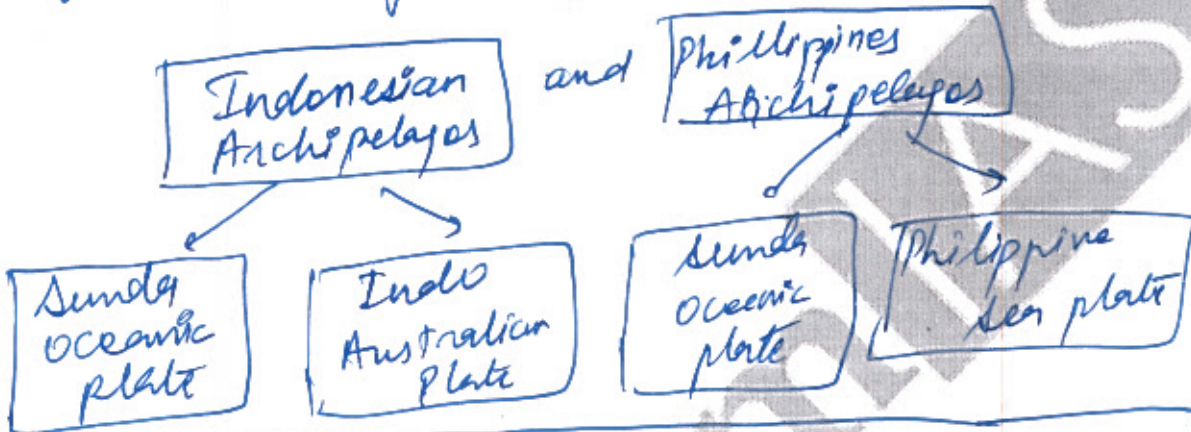
As the Circum Pacific Belt harbours the majority of Natural disasters, disaster resilience infrastructure and proper early warning system with rehabilitation facilities would help in mitigating the consequences.

Overall Grading (✓)

Poor			Average			Good		
1	2	3	4	5	6	7	8	9

Q.2)

Archipelagos refers to clusters of relatively small islands, tend to be predominantly volcanic due to movement of oceanic-oceanic plates



Formation

- ① Indonesian and Philippines archipelagos are located at the convergence of ocean-ocean plate

② When both collide \rightarrow denser ocean plate subducts into asthenosphere \rightarrow this region is called subduction zone.

③ Due to high temperature and pressure, rocks undergo metamorphism and melts to form magma

④ At the surface magma escapes in the form of volcanic eruptions. \rightarrow constant eruptions form volcanic mountains

⑤ Over time the mountains merge, and oceanic crust gets transformed into continental crust

⑥ This lead to formation of Indonesian and Philippines archipelagos.

The region is also located on the Pacific Ring of Fire and its frequency is higher ~~with~~ which make it a continuous process ~~which~~ and help in understanding the geology of the area.

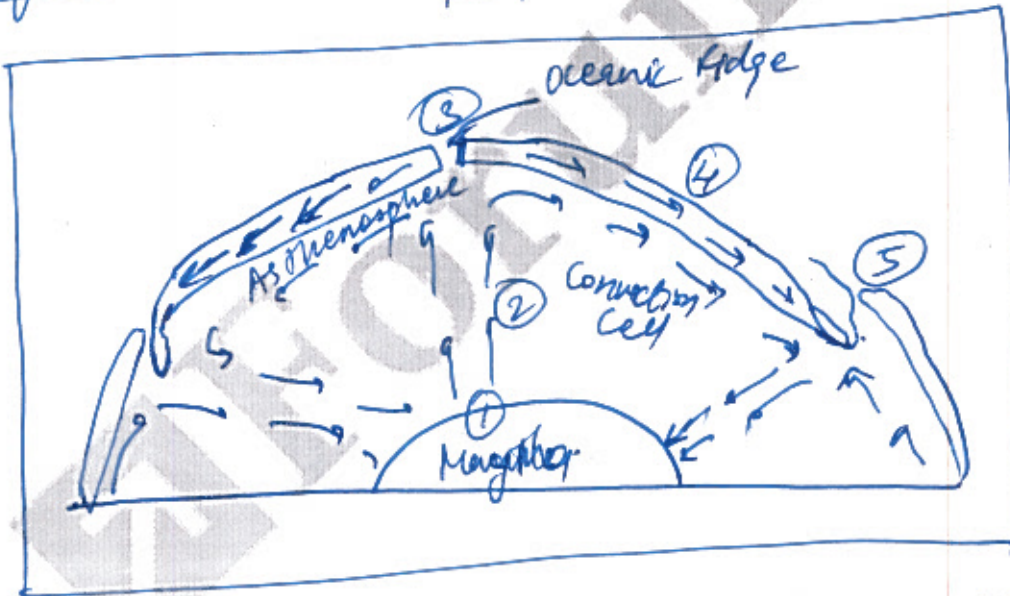
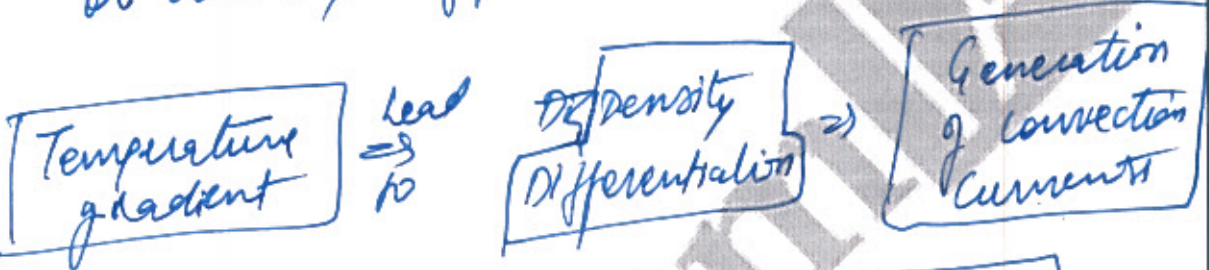
Overall Grading (✓)

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Q.3)

Arthur Holmes, in 1930 discovered the possibility of convection currents operating on the mantle portion.

Convection currents are flowing fluids because there is a temperature or density difference within the material.



→ Rising limbs of cell creates enormous energy → puts pressure on crust and breaks it.
 → Different limbs → move onto opposite direction → meets the lithosphere plate.

Different zones (marked on diagram)

- ① Heat is generated due to the decay of radioactive elements and heat remaining from the formation of Earth.
- ② The heat slowly rises through the mantle to the asthenosphere.
- ③ Ridge push → the intrusion of magma into an oceanic ridge pushes the plate away.
- ④ Plates float on the convection current of the asthenosphere = frictional force
- ⑤ The denser oceanic slab sinks into the subduction zone at the trenches due to gravitational force [eg: Marianas Trench].

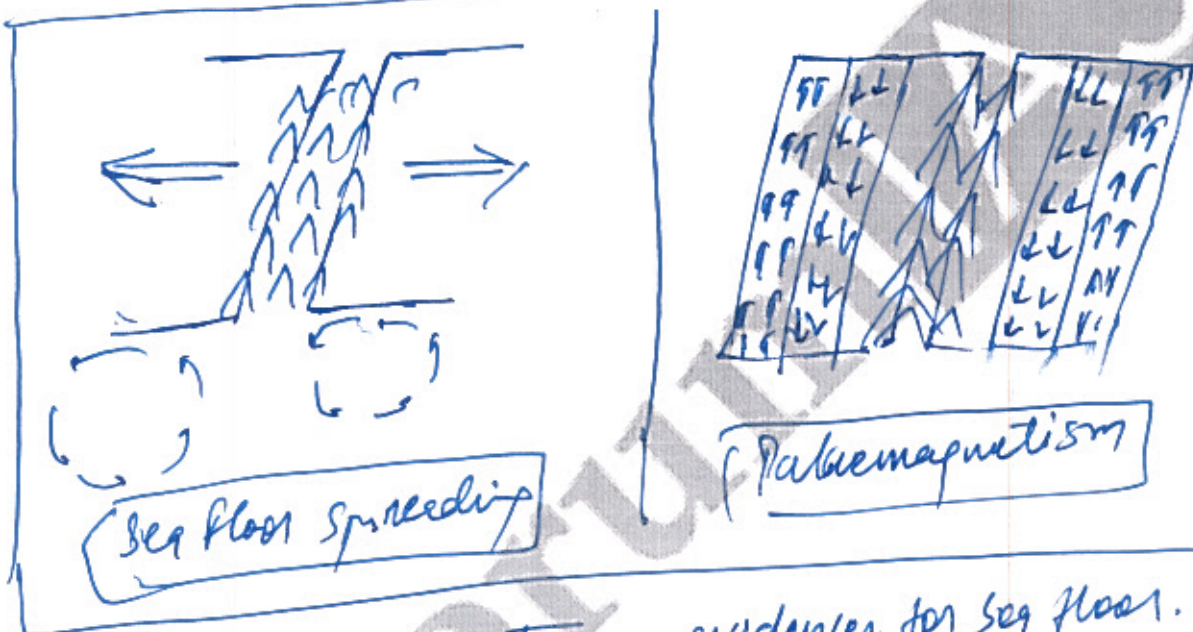
Convection current hypothesis has provided an important mechanism for explaining the continental drift, sea floor spreading and plate tectonic.

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Q.4)

Sea floor spreading was given by Hess and said that convection currents rupture the oceanic crust at mid oceanic ridges through constant eruption pushing oceanic crust on either side.



Characteristics features - evidences for sea floor.

- ① Oceanic crust are much younger than the continental crust → oceanic crust → subducts → due to spreading.
- ② Rocks on either side of the oceanic floor ridges have equal distance locations
- ③ Age increases from mid oceanic ridges.

Palaeomagnetism

↳ The study of magnetic rocks and sediments to record the history of the magnetic field -

Evidence of sea floor hypothesis

① Majority of ocean floor → basaltic rocks → have magnetic materials → align themselves in the magnetic field direction

② Alternate magnetic rock stripes were flipped, with one stripe having normal polarity and next having reversed polarity

③ Even the alternate strips with palaeomagnetism property have same age.

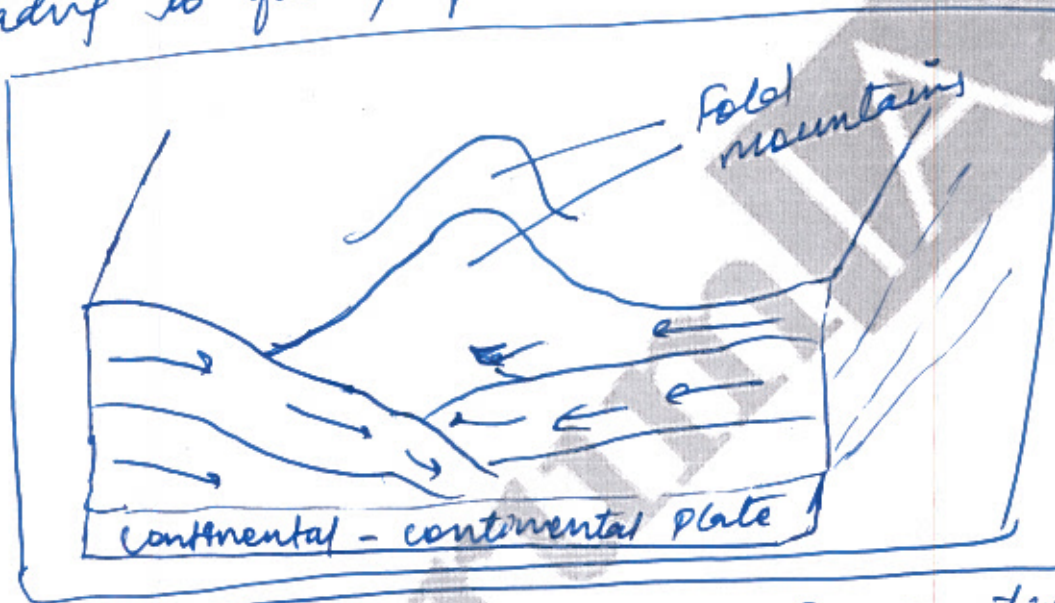
Therefore, sea floor spreading and palaeomagnetism provided foundation ground for plate tectonic theory.

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Q.5)

Fold mountains are the mountains formed from the folding of the earth crust. They are formed when two tectonic plates move towards each other, leading to folding of the layers of Earth.



Fold mountains - located on margins of continents

- ① When two plates collide - say continent-continent / oceanic \Rightarrow thrust is created between the two.
eg: Himalayas.
- ② Two forces acting between the mountains reaches its limit and start forming a layer on another.

③ Constant layering due to greater thrust lead to formation of fold mountains.

Q: Indo-Australian plate and Eurasian plate lead to formation of Himalayas.

Q: Oceanic-continent collision → Andes.



Relation between fold mountain and Earthquake

↳ Continental-continental convergence is associated with collision → results in earthquakes → denser plate pushes the other → creating fault zone.

→ Continuous folding leads to Nappe
→ one slides over other → huge energy → earthquake.

→ In oceanic-continental collision, subducting oceanic plate grinds against the other
 ↳ results in deep seated earthquakes.
 [eg:] Andes fold mountain formation.

Relation between fold mountains and volcanoes.

① Collision between oceanic and continental plate takes place → oceanic plate subducts (denser)

↳ Magma rises to the surface to form volcanoes either as an island arc or as continental landmass (volcanoes of Andes)
 (West Indies)

fold mountain formation

The global distribution of fold mountains is due to interaction between various tectonic plates and has close relationship between volcanoes and earthquakes.

Overall Grading (✓)

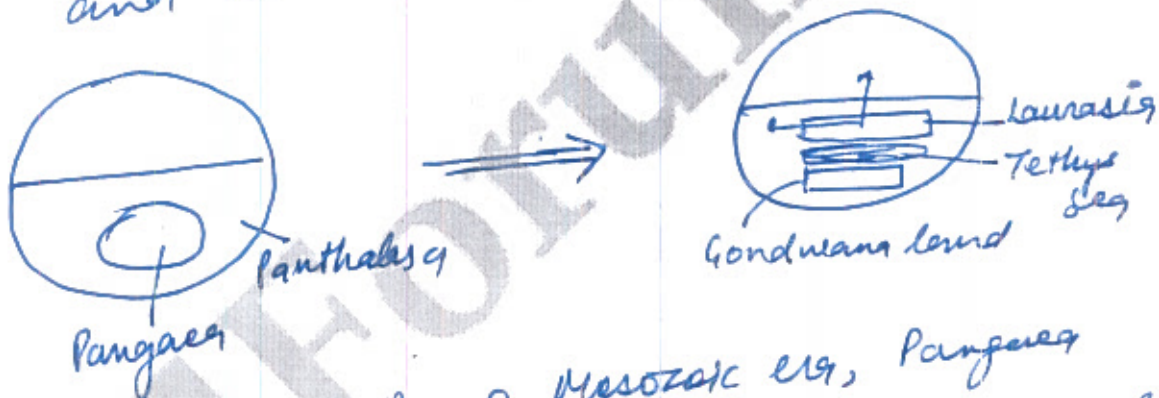
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Q.6)

The theory of continental drift was propounded by Alfred Wegener in 1910 to explain the major variations of climate in the past.

Theory

↳ About 200 million years ago, the continents of earth were united to form supercontinent called Pangea and surrounded by super ocean Panthalassa.



↳ At the beginning of Mesozoic era, Pangea break up into two landmasses Laurasia and Gondwanaland.

↳ They further broke into smaller pieces due tidal and pole-fleeing force and drifted to present position.
Also continent float on ocean

Prominent pieces of evidence

① Jig-saw-fit

Atlantic coast of South America and Africa has similar shape.



② Rocks of same ages across the oceans → structure fit evidence.

③ tillite → sedimentary rocks formed out of deposits of glaciers
 [caps] Talchar Odisha.

④ Placer Deposits

↳ occurrence of rich placer deposits of gold at Ghana coast and absence of source rock → veins were in the Brazil.

⑤ Distribution of Fossils



Glossopteris

↳ Fossils of this fern have been found in ~~the~~ all the southern continents.
 ↳ shows they were all once joined together

Limitations

- ↳ Did not explain the breaking apart of Pangaea.
- ↳ Differential gravitational forces and pole fleeing forces were not sufficient enough to divide the continents apart
- ↳ fails to explain some formation of mountains such as Himalayas, Ural etc.

Though the theory has some limitations but it provided the foundation for the development of subsequent theories such as Plate tectonic theory

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Q.7)

The plate tectonic theory was developed by McKenzie, Parker and Morgan in 1967.

It was based on 3 evidences



→ A tectonic plate generally irregular in shape ~~and~~ which composed of both continental and oceanic lithosphere

eg: Pacific Plate - Oceanic
Eurasian Plate - continental.

→ These plates moves towards or away from each other and results in the formation of continents and landmass present today.

Types of Plate Boundaries

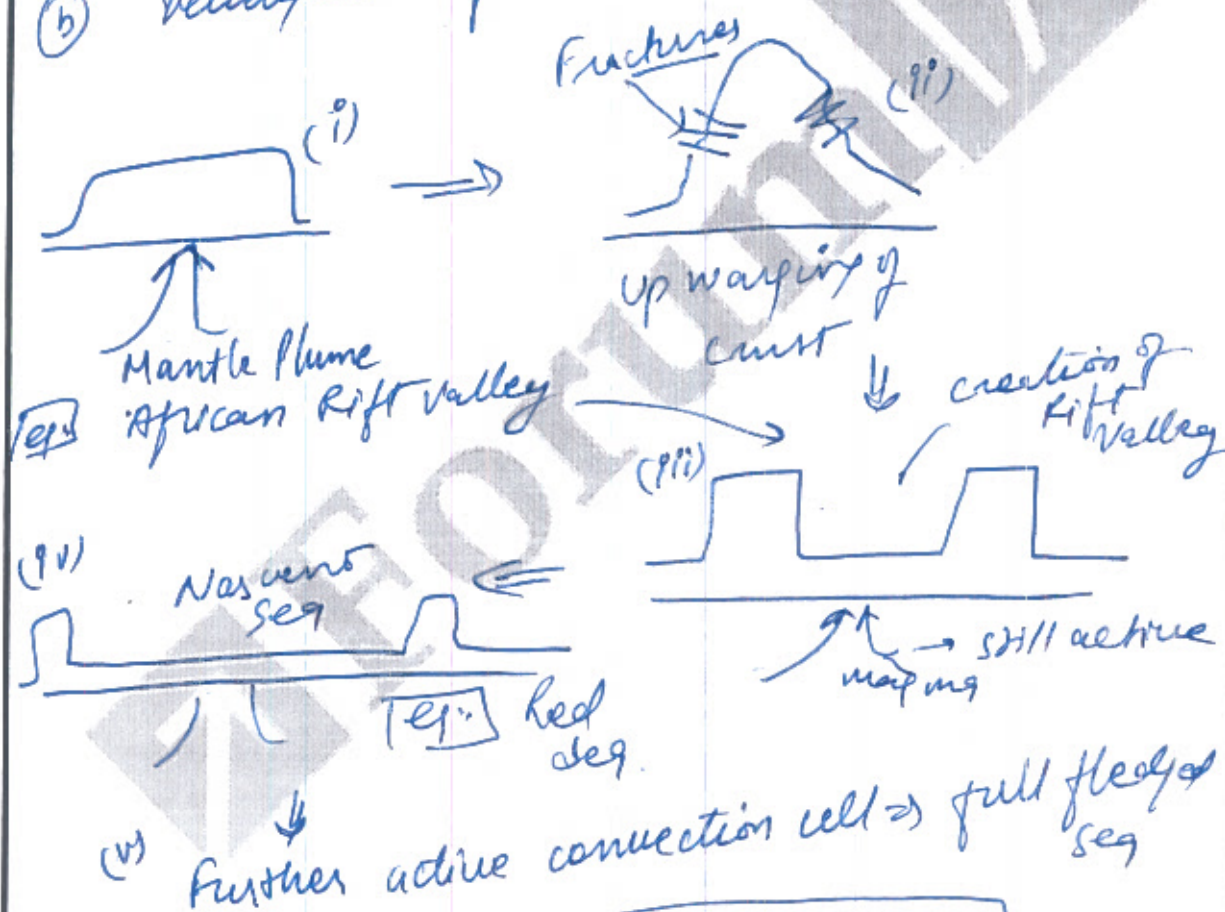
① Divergent Boundaries → these are developed in those region where convection cell has rising limbs.

(a) Ocean-ocean plate



→ lead to formation of Mid Oceanic Ridges (MOR)
 [ex:] Atlantic Ocean - (MOR).

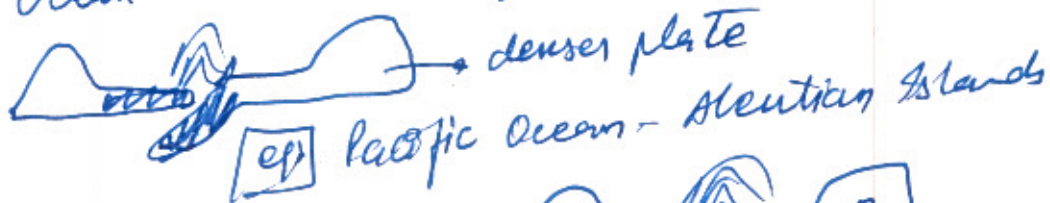
(b) Development of cracks under continental crust.



Convergent plate boundaries

(2) → plates move towards each other
 → collision takes place and deformation of lithosphere plate.

⑨ Ocean-Ocean convergence



⑩ Ocean-Continent → denser.

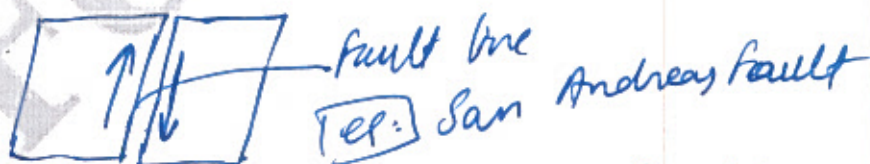


⑪ Continent-Continent → Fold mountains.
No volcanic eruptions



⑫ Transform Boundaries

↳ Neither crust is produced or destroyed as plate slide horizontally each other.



Thus the plate tectonic theory gave the scientific ~~and~~ evidences related to the formation of different land forms which helped in better understanding of the geology.

Overall Grading (✓)

Poor			Average			Good		
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