

WRAP Exams · wrapexams.com

Prelims PYQ, Mains model answers, and copy evaluation. Write to the desk for this paper, a doubt, or the AI waitlist.

ask@wrapexams.com · +91 85951 84903 · wrapexams.com

Q16

Discuss how the changes in shape and sizes of continents and ocean basins of the planet take place due to tectonic movements of the crustal masses.

UPSC Civil Services Mains 2025 · GS I · 15 marks · World's Physical Geography

Salient features of world's physical geography.

Core demand of the question

- State plate tectonics as the engine of continental and ocean-basin change
- Explain seafloor spreading, subduction, collision, rifting with map examples
- Link shape and size change to geological time, not to a year

Revision summary

- **Plate tectonics moves crust:** new seafloor at ridges, destruction at trenches, collision of continents.

The Atlantic and Red Sea show growth of ocean basins; the Pacific trenches show consumption.

India's northward drift closed the **Tethys** and built the Himalaya, changing both continent shape and climate.

Rifts such as East Africa may birth new seas.

These size and shape changes run over millions of years, not over a planning decade.

Introduction

Continents and oceans look fixed on a school atlas. On a clock of **millions of years** they crawl. The crust is broken into **plates**. Where plates **pull apart**, an ocean is born. Where they **meet**, an ocean may die and a mountain may rise. Shape and size of basins and continents are the **slow drawing** of that motion.

Body

Spreading: oceans grow

At **mid-ocean ridges**, magma rises and new seafloor forms. The **Atlantic** has been widening since Pangaea split. Africa and South America still show the **jigsaw**. The **Red Sea** and **Gulf of Aden** are a young ocean. India once sat against Africa and Madagascar; the **Indian Ocean** opened as India drifted north. Size of an ocean basin **increases** at a spreading ridge.

Subduction: oceans shrink, arcs form

- **Where a plate dives, seafloor is destroyed. The Pacific is ringed by trenches: Japan, Andes, Indonesia.** An ocean can **close**. The **Tethys** closed as India met Asia, which is why the **Himalaya and Tibetan Plateau** exist and why the Indian continent's northern edge is crumpled. Continents rarely subduct wholesale because they are buoyant, but they **change**

shape: India is still pushing into Asia, so the collision zone thickens and shortens.

Rift, transform, and the map in motion

East Africa's **rift** may split a new sea. **Transform faults** (San Andreas) slide plates sideways and change coast shape without creating much new crust. **Supercontinent cycles** assemble and break worlds: Pangaea is the famous last assembly.

- **Consequences for the planet's look:** **Himalayan rivers** reverse or capture; **climate** changes when mountains rise and when seaways open (think of the **Drake Passage** and Antarctic cooling). Islands appear as arcs. The **Mediterranean** is a leftover of **Tethys**.

Nothing here is a human lifetime. The explanation of "changes in shape and sizes" is **plate kinematics plus time**.

Flow diagram

Pangaea -> Atlantic opens
Pangaea -> India drifts north
India drifts north -> Himalaya Tethys closes
Mid-ocean ridge -> Ocean grows
Subduction -> Ocean shrinks

Conclusion

Plates spread, sink and collide. Oceans grow at ridges and shrink at trenches. Continents rift, crash and crumple, as India still does against Asia. The atlas is a snapshot of that long motion.

Facts & figures

Mid-ocean ridge

A submarine mountain chain where plates diverge and new oceanic crust is made.

Tethys

The ocean that closed between India and Asia, whose sediments are now in the Himalaya.

Red Sea rift

A living example of a continent splitting and a young ocean basin forming.