

Class- 9

Plate Tectonic

Full Marks- 10

1. A student lists the layers of the Earth and argues that tectonic plates are not made of a single layer but actually combine two distinct zones of the Earth into one rigid unit that moves together over a semi-fluid base.

The two components that together form a tectonic plate are —

- a) Asthenosphere and the lower mantle
- b) Inner core and the outer crust of continents
- c) Mantle plume zone and the oceanic crust only
- d) The rigid crust and the uppermost part of the mantle

2. Among all the forces responsible for plate movement, scientists consider one force to be one of the important . This force operates specifically at a zone where old, cold, and dense oceanic plates interact with the mantle below.

The force considered most dominant in driving plate movement is —

- a) Ridge push at mid-ocean spreading centres
- b) Convection currents circulating in the mantle
- c) Mantle plumes creating hotspots beneath plates
- d) Slab pull at subduction zones due to plate density

3. A mid-ocean ridge is characterised by very high heat flow, shallow and weak earthquakes, and continuous volcanic activity. A researcher studying the Pacific Plate notes that despite being one of the largest tectonic plates, it is entirely oceanic in nature and is associated primarily with a zone of intense geological activity.

The statement that contradicts the information given above about plate boundaries and the Pacific Plate is —

- a) The Pacific Plate is surrounded by subduction zones forming the Ring of Fire
- b) Mid-ocean ridges are divergent boundaries with very high heat flow values
- c) Divergent boundaries produce shallow earthquakes and active volcanism
- d) The Pacific Plate, being oceanic, has a lower density than continental plates

4. The Himalayas continue to rise even today, and the region experiences frequent earthquakes and landslides. Scientists attribute this ongoing geological activity to a process that has been operating for the past few million years without having completely stopped.

The most accurate reason for the Himalayas still being geologically active and continuing to rise is —

- a) The Tethys Sea sediments are still being deposited on the ocean floor
- b) Volcanic activity beneath the Indian Plate pushes the crust upward
- c) The Eurasian Plate is moving southward and overriding the Indian Plate

d) The Indian Plate is still moving northward and pressing against the Eurasian Plate

5. A geologist studying a particular plate boundary notes that no new crust is being formed and no existing crust is being destroyed. However, the region experiences frequent and powerful shallow earthquakes due to immense friction generated between the two plates.

The boundary being described and its correct classification are —

- a) Divergent boundary, also called a destructive margin
- b) Convergent boundary, also called a constructive margin
- c) Convergent boundary, also called a conservative margin
- d) Transform boundary, also called a conservative margin

6. The Earth's lithosphere is not a single unbroken shell but a collection of rigid fragments that interact at their margins, giving rise to contrasting patterns of seismic intensity, volcanic behaviour, and crustal modification across different regions of the globe.

A researcher classifies three interaction zones based on field observations —

Zone A — High heat flow; periodic surfacing of molten material; ocean floor age increases with distance from the centre.

Zone B — Both shallow and deep-focus tremors recorded; permanent loss of crustal material into the interior; a deep elongated depression exists.

Zone C — High magnitude tremors; complete absence of volcanic phenomena; total crustal volume remains unchanged.

Represent each zone through clearly labelled diagrams and explain the mechanism responsible for the distinct geological characteristics observed in each zone. (2+3)