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CUET · GEOGRAPHY · CLASS XI · CODE 313

Structure and Physiography

CUET unit: The Origin and Evolution of the Earth

By **UniDrill** · NCERT-grounded study material

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📌 Snapshot

- India has three geological divisions and six physiographic divisions — one of the highest-yield areas for CUET Geography.
- Endogenic and exogenic forces, together with plate tectonics, produced India's present relief — connecting physical geography theory directly to India-specific landforms.
- Every physiographic division (mountains, plains, plateau, desert, coasts, islands) carries specific dimensions, elevations, and named landforms — exactly the kind of data NTA tests.
- The distinction between the stable Peninsular Block and the young, flexible Himalayas is a recurring CUET theme, as is the contrast between western (submerged) and eastern (emergent) coasts.
- Key terminology (Bhabar, Tarai, Khadar, Bhangar, barchan, Kayal) frequently appears as direct-recall or definition-match questions.

📖 Detailed Notes

2.1 Core concepts

Geological Divisions of India

- India is divided into three geological divisions based on variations in geological structure and formations: (i) The Peninsular Block, (ii) The Himalayas and other Peninsular Mountains, and (iii) Indo-Ganga-Brahmaputra Plain. (NCERT §Structure and Physiography, p. 8)
- The earth is approximately 4,600 million years old; its landforms have evolved through endogenic and exogenic forces. The Indian plate was originally south of the equator and was part of a larger plate that included the Australian plate; its northward movement continues. (NCERT p. 8)

The Peninsular Block

- The northern boundary of the Peninsular Block runs irregularly from Kachchh along the western flank of the Aravali Range near Delhi, then roughly parallel to the Yamuna and Ganga up to the Rajmahal Hills and the Ganga delta. Karbi Anglong, Meghalaya Plateau, and Rajasthan are extensions of this block. (NCERT §The Peninsular Block, p. 8)

- The Peninsula is formed essentially by ancient gneisses and granites; it has stood as a rigid block since the Cambrian period. As part of the Indo-Australian Plate, it has been subjected to vertical movements and block faulting — the rift valleys of the Narmada, Tapi, and Mahanadi, and the Satpura block mountains are examples. (NCERT p. 8–9)
- The Peninsula mostly consists of relict and residual mountains: Aravali hills, Nallamala hills, Javadi hills, Veliconda hills, Palkonda range, and Mahendragiri hills. River valleys here are shallow with low gradients. (NCERT p. 9)

The Himalayas and Other Peninsular Mountains

- The Himalayas are young, weak, and flexible — unlike the rigid Peninsular Block. They are still subject to endogenic and exogenic forces, resulting in faults, folds, and thrust plains. They are tectonic in origin, dissected by fast-flowing rivers in youthful stage, producing gorges, V-shaped valleys, rapids, and waterfalls. (NCERT §The Himalayas and other Peninsular Mountains, p. 9)

Indo-Ganga-Brahmaputra Plain

- Originally a geo-synclinal depression, it attained maximum development during the third phase of Himalayan formation (~64 million years ago) and has since been filled by sediments from Himalayan and Peninsular rivers. Average depth of alluvial deposits is 1,000–2,000 m. (NCERT §Indo-Ganga-Brahmaputra Plain, p. 9)

Physiography — Six Divisions

- India's physiography is the outcome of structure, process, and stage of development. The six physiographic divisions are: (1) Northern and North-eastern Mountains, (2) Northern Plain, (3) Peninsular Plateau, (4) Indian Desert, (5) Coastal Plains, (6) Islands. (NCERT §Physiography, p. 9, 11)

Northern and North-eastern Mountains

- Consist of the Himalayas and Northeastern hills. The Great Himalayan range (central axial range) is ~2,500 km long (east to west) and 160–400 km wide (north to south). Orientation is northwest-southeast in northwestern India, east-west in Darjiling/ Sikkim, southwest-northwest in Arunachal Pradesh, and north-south in Nagaland, Manipur, and Mizoram. (NCERT §The North and Northeastern Mountains, p. 11)
- The Himalayas are not only a physical barrier but also a climatic, drainage, and cultural divide. (NCERT p. 11)

Northern Plains

- Formed by alluvial deposits of the Indus, Ganga, and Brahmaputra. Extent: ~3,200 km east to west; width 150–300 km; alluvium depth 1,000–2,000 m. Divided north to south into: Bhabar, Tarai, and alluvial plains (Bhangar and Khadar). (NCERT §The Northern Plains, p. 11)

- Bhabar: narrow belt of 8–10 km parallel to Shiwalik foothills; streams deposit heavy rocks and boulders here and sometimes disappear. (NCERT p. 11)
- Tarai: ~10–20 km wide south of Bhabar; streams re-emerge without demarcated channels, creating marshy/swampy conditions with luxuriant vegetation and wildlife. (NCERT p. 11)
- Bhangar (old alluvium) and Khadar (new alluvium) lie south of Tarai; feature meanders, oxbow lakes, sand bars, and braided channels. Brahmaputra plains known for riverine islands and sand bars. (NCERT p. 11–12)
- General elevation: 50–150 m above MSL. Haryana and Delhi form a water divide between the Indus and Ganga systems. Brahmaputra flows northeast to southwest, takes a ~90° southward turn at Dhubri before entering Bangladesh. The Sunderbans delta is one of the world's largest. (NCERT p. 12)

Peninsular Plateau

- Irregular triangle rising 150 m above river plains to 600–900 m elevation. Outer extent: Delhi ridge (NW), Rajmahal hills (E), Gir range (W), Cardamom hills (S). Extension in northeast as Shillong and Karbi-Anglong plateau. (NCERT §The Peninsular Plateau, p. 12)
- One of India's oldest and most stable landmasses. General slope is west to east (proved by river flow pattern). Features include tors, block mountains, rift valleys, spurs, hummocky hills, quartzite dykes, and black soil in the western/northwestern part. (NCERT p. 12)
- The Bhima fault is noteworthy for recurrent seismic activity. Ravines of Chambal, Bhind, and Morena are notable examples of complex relief. (NCERT p. 12)
- Three sub-divisions: (i) Deccan Plateau, (ii) Central Highlands, (iii) Northeastern Plateau. (NCERT p. 12)
- Deccan Plateau: bordered by Western Ghats (W), Eastern Ghats (E), and Satpura/Maikal/Mahadeo hills (N). Western Ghats are locally known as Sahyadri (Maharashtra), Nilgiri hills (Karnataka/Tamil Nadu), Anaimalai and Cardamom hills (Kerala). Average elevation of Western Ghats ~1,500 m; highest peak is Anaimudi (2,695 m) on Anaimalai hills, followed by Dodabetta (2,637 m) on Nilgiri hills. Eastern and Western Ghats meet at Nilgiri hills. (NCERT §The Deccan Plateau, p. 12–13)
- Central Highlands: bounded west by Aravali; Satpura range at 600–900 m forms northernmost boundary of Deccan plateau. Elevation 700–1,000 m; slopes north and northeast. Tributaries of Yamuna originate in Vindhyan and Kaimur ranges; Banas is the only significant tributary of Chambal originating from Aravalli. (NCERT §The Central Highlands, p. 13)
- Northeastern Plateau (Meghalaya/Karbi Anglong): extension of main Peninsular plateau, detached due to fault created by northeastward movement of Indian plate during Himalayan origin. Meghalaya plateau subdivided into Garo Hills, Khasi Hills, Jaintia Hills. Rich in coal, iron ore, sillimanite, limestone, and uranium. Heavily eroded

by SW monsoon; Cherrapunji shows bare rocky surface. (NCERT §The Northeastern Plateau, p. 13)

Indian Desert

- Located northwest of Aravali hills; undulating topography with longitudinal dunes and barchans. Rainfall below 150 mm/year; arid climate; also known as Marusthali. During Mesozoic era it was under the sea (evidenced by wood fossils at Aakal ~180 million years old, and marine deposits near Jaisalmer). (NCERT §The Indian Desert, p. 13)
- Northern part slopes towards Sindh; southern part towards Rann of Kachchh. Most rivers are ephemeral; the Luni is the significant river in the southern part. Some streams present inland drainage by joining lakes or playas. Salt obtained from brackish lake/playa water. (NCERT p. 13–14)

Coastal Plains

- Divided into western and eastern coastal plains. (NCERT §The Coastal Plains, p. 14)
- Western coast: submerged coastal plain, narrow belt; provides natural conditions for ports and harbours (Kandla, Mazagaon, JLN Port Navha Sheva, Marmagao, Mangalore, Cochin). From north to south: Kachchh and Kathiawar coast (Gujarat), Konkan coast (Maharashtra), Goan coast, Malabar coast (Karnataka/Kerala). Narrow in middle, broader towards north and south. Rivers do not form deltas. Malabar coast features Kayals (backwaters) used for fishing, inland navigation, and tourism; Nehru Trophy Vallamkali held at Punnamada Kayal. (NCERT p. 14)
- Eastern coast: emergent coastal plain, broader than western; well-developed deltas of Mahanadi, Godavari, Krishna, and Kaveri. Continental shelf extends up to 500 km, limiting port development. (NCERT p. 14)

Islands

- Bay of Bengal islands: ~572 islands/islets between 6°N–14°N and 92°E–94°E. Two principal groups: Ritchie's Archipelago and Labrynth Island. Divided into Andaman (north) and Nicobar (south), separated by the Ten Degree Channel. Believed to be elevated portions of submarine mountains; some are volcanic. Barren Island is the only active volcano in India. Key peaks: Saddle Peak (North Andaman, 738 m), Mount Diavolo (Middle Andaman, 515 m), Mount Koyob (South Andaman, 460 m), Mount Thuiller (Great Nicobar, 642 m). Receives convectional rainfall; equatorial vegetation. (NCERT §The Islands, p. 15)
- Arabian Sea islands: Lakshadweep and Minicoy, scattered between 8°N–12°N and 71°E–74°E, 220–440 km off Kerala coast. Entirely built of coral deposits; 36 islands, 11 inhabited. Minicoy is the largest island (453 sq. km). Divided by Nine Degree Channel: Amini Island (north), Canannore Island (south). (NCERT p. 15)
- **Three-fold longitudinal division of the Himalayas:** From north to south the Himalayas are conventionally divided into (i) the Greater (Inner) Himalaya or Himadri

— average elevation >6,000 m, contains all the major snow-clad peaks (Everest 8,848 m, Kanchenjunga 8,598 m, Nanda Devi 7,817 m, Kamet 7,756 m) and is folded asymmetrically with a steep southern face; (ii) the Lesser Himalaya or Himachal — average 3,500–4,500 m, hosts the famous hill stations (Shimla, Mussoorie, Nainital, Darjiling) and ranges such as Pir Panjal, Dhauladhar and Mahabharat; (iii) the Shiwalik or Outer Himalaya — 600–1,500 m, made of unconsolidated alluvium washed down from the higher ranges, with longitudinal valleys called Duns (e.g., Dehra Dun, Patli Dun, Kotli Dun). These belong to the Northern Mountains physiography; locate them on Figure 2.2.

- **Eastern Hills / Purvanchal:** Beyond the Brahmaputra at Dihang Gorge the Himalayas swing sharply south to form the Purvanchal — the Patkai Bum, Naga Hills (Saramati 3,826 m), Manipur Hills and Mizo (Lushai) Hills. Composed of sandstones, shales and conglomerates of Tertiary age, these hills are densely forested, receive heavy convectional rainfall, and form the political boundary with Myanmar.
- **Karewas of Kashmir Valley:** The Kashmir Valley, an intermontane basin between the Pir Panjal and the Greater Himalaya, contains Karewas — thick lacustrine and glacio-fluvial deposits famous for saffron cultivation. They mark a former glacial lake floor and are tested as a special landform in the Himachal section.
- **Indo-Gangetic divide and Brahmaputra deflection:** Within the Northern Plains, the Delhi Ridge–Yamuna line forms the water divide between the Indus and the Ganga systems; the Brahmaputra, which flows northeast-to-southwest through Assam, takes a sharp ~90° southward turn near Dhubri before entering Bangladesh as the Jamuna. The Sundarbans delta — the combined deposit of the Ganga and the Brahmaputra in the Bay of Bengal — is the world's largest delta, around 58,752 sq km.
- **Three sub-divisions of Peninsular Plateau in detail:** The Deccan Plateau (south of Satpura/Maikal/Mahadeo, bounded by Western and Eastern Ghats) holds black soil tracts and basaltic Deccan Traps; the Central Highlands (north of Vindhya–Satpura, bounded west by Aravalli) include the Malwa and Bundelkhand plateaus and feed the Chambal–Betwa–Ken into the Yamuna; the North-eastern Plateau (Meghalaya plus Karbi Anglong) is a detached extension that drifted away during the Himalayan upheaval, now famous for coal at Cherrapunji, uranium at Domiasiat and the world's wettest stations Mawsynram/Cherrapunji.

2.2 Definitions to memorise

Term	Definition	Page
Bhabar	Narrow belt of 8–10 km parallel to Shiwalik foothills where streams deposit heavy boulders and sometimes disappear	11
Tarai	Belt ~10–20 km wide south of Bhabar where streams re-emerge without demarcated channels, forming marshy/swampy conditions	11
Bhangar	Old alluvial deposits lying south of the Tarai belt	11

Term	Definition	Page
Khadar	New alluvial deposits lying south of the Tarai belt	11
Barchan	Crescent-shaped sand dune found in the Indian Desert (Thar)	13
Marusthali	Another name for the Great Indian Desert (Thar), meaning "land of death"	13
Kayal	Backwaters along the Malabar coast used for fishing, inland navigation, and tourism	14
Geo-synclinal depression	Trough/downwarp in the earth's crust; the Indo-Gangetic Plain originated as such a depression	9
Playa	Dry lake bed found in the Indian Desert; lakes and playas here have brackish water	14
Ten Degree Channel	Water body separating the Andaman Islands (north) from the Nicobar Islands (south)	15
Nine Degree Channel	Water body dividing the Lakshadweep islands: Amini Island to the north, Canannore Island to the south	15
Anaimudi	Highest peak of the Peninsular plateau (2,695 m), located on Anaimalai hills, Western Ghats	13
Dun	Longitudinal valley between the Lesser Himalaya and the Shiwaliks (e.g., Dehra Dun, Patli Dun)	11
Himadri	Greater (Inner) Himalaya — northernmost range, average elevation above 6,000 m	11
Himachal	Lesser Himalaya — middle range, average elevation 3,500–4,500 m	11
Shiwalik	Outer Himalaya — southernmost range, 600–1,500 m, composed of unconsolidated alluvium	11
Purvanchal	Eastern hills of the Indian sub-continent (Patkai, Naga, Manipur, Mizo)	11
Karewa	Thick lacustrine/glacio-fluvial deposits of the Kashmir Valley; famous for saffron cultivation	11
Deccan Traps	Vast basaltic flood-basalt outpouring of the late Cretaceous covering much of the Peninsular plateau	12
Saddle Peak	Highest point of the Andamans (738 m) on North Andaman	15

2.3 Diagrams / processes to remember

- **Figure 2.2 — India: Physical Map (p. 10):** Study this map carefully for locations of all physiographic divisions, major peaks (Everest, Kanchenjunga, Nanda Devi, Kamet, Namcha Barwa), river systems, and elevation zones. NTA frequently uses this map as a base for MCQs.

- **Figure 2.1 — A Gorge (p. 9):** Represents the youthful stage of Himalayan rivers — connects to V-shaped valleys, rapids, and waterfalls produced by tectonic, fast-flowing rivers.
- **Figure 2.3 — The Himalayas (p. 11):** Visual reference for the parallel ranges and their general northwest-southeast orientation in northwestern India.
- **Figure 2.4 — Northern Plain (p. 11):** Represents the featureless alluvial plain; connects to the Bhabar-Tarai-Bhangar/Khadar sequence running north to south.
- **Figure 2.5 — A Part of Peninsular Plateau (p. 12):** Shows the stable, ancient tableland character of the plateau contrasted with the Himalayas.
- **Figure 2.6 — The Indian Desert (p. 14):** Shows sand dunes (barchans/longitudinal dunes); students should be able to identify crescent-shaped barchans vs. longitudinal dunes.
- **Figure 2.8 — An Island (p. 15):** Coral island character of Lakshadweep (entirely coral) vs. the submarine mountain/volcanic origin of Andaman & Nicobar.

2.5 Key data table (NCERT figures to memorise)

#	Feature	Value	NCERT page
1	Age of the Earth	~4,600 million years	8
2	Northern boundary of Peninsular Block ends at	Rajmahal Hills / Ganga delta	8
3	Average depth of alluvium in Indo-Gangetic Plain	1,000–2,000 m	9
4	Length of Great Himalayan range (E–W)	~2,500 km	11
5	Width of Himalayas (N–S)	160–400 km	11
6	Width of Bhabar belt	8–10 km	11
7	Width of Tarai belt	10–20 km	11
8	General elevation of Northern Plains above MSL	50–150 m	12
9	Elevation of Peninsular Plateau	150 m (above river plains) → 600–900 m	12
10	Average elevation of Western Ghats	~1,500 m	13
11	Highest peak of Peninsular plateau — Anaimudi	2,695 m	13
12	Dodabetta (Nilgiri hills)	2,637 m	13
13	Annual rainfall over Indian Desert	<150 mm	13
14	Andaman & Nicobar — total islands/ islets	~572	15

#	Feature	Value	NCERT page
15	Largest Lakshadweep island — Minicoy	453 sq km	15

2.4 Common confusions / NTA trap points

- **Anaimudi vs. Dodabetta confusion:** Anaimudi (2,695 m) is on the Anaimalai hills; Dodabetta (2,637 m) is on the Nilgiri hills. NTA often swaps the peaks or the hills. Remember: Anaimudi is the highest peak of the entire Peninsular plateau.
- **Ten Degree Channel vs. Nine Degree Channel:** Ten Degree Channel separates Andaman from Nicobar (Bay of Bengal group). Nine Degree Channel divides Lakshadweep (Arabian Sea group). Students confuse which channel belongs to which island group.
- **Western coast is submerged (no deltas); eastern coast is emergent (well-developed deltas):** A common distractor is to state the opposite. The submerged nature of the western coast is why rivers do not form deltas and why ports are naturally good there.
- **Bhangar = old alluvium; Khadar = new alluvium:** NTA reverses these as a trap. Bhangar lies at a higher level and is older; Khadar lies closer to the river channels and is newer/more fertile.
- **Lakshadweep is entirely coral; Andaman & Nicobar are submarine mountain/volcanic origin:** Students incorrectly assign coral origin to both. Only Lakshadweep is entirely built of coral deposits; Barren Island (volcanic) is in Andaman & Nicobar.
- **Himalayan range names — Himadri / Himachal / Shiwalik:** Memorise the longitudinal three-fold division (Greater, Lesser, Outer) with their elevation bands (>6,000 m / 3,500–4,500 m / 600–1,500 m). NTA frequently swaps Himachal and Shiwalik in match-the-following.
- **Peninsular plateau slope direction:** NCERT states the general slope is from west to east, evidenced by Peninsular rivers (Mahanadi, Godavari, Krishna, Kaveri) flowing west-to-east. Narmada and Tapi are the structural exceptions — they flow west because of rift faulting, not because the plateau slopes that way.
- **Aravalli — relict mountains, not a young range:** The Aravalli is one of the world's oldest fold mountains, now eroded to residual ridges. Students sometimes treat it as a "young" range like the Himalayas.
- **Marusthali rainfall is <150 mm, not <300 mm:** NCERT prints the cut-off as below 150 mm per year. NTA inserts 300 mm as a distractor.
- **Sundarbans is in the Bay of Bengal, formed by Ganga–Brahmaputra:** It is one of the world's largest deltas; the western coast does NOT have any equivalent because rivers there flow through narrow plains into a submerged coast.

🎯 Practice MCQs

📊 PYQ Alignment

This chapter is one of the most frequently tested in CUET Geography, with questions regularly drawn from the classification and characteristics of physiographic divisions (especially the Northern Plains sub-zones, Peninsular Plateau subdivisions, and island groups); the identification of peaks, channels, and local names typically accounts for 2–3 direct-recall MCQs, while the contrast between submerged western coast and emergent eastern coast, and the geological character of the Himalayan versus Peninsular regions, generates statement-based and assertion-reason questions almost every year. The solved CUET PYQ archive on this chapter is at `/pyq/geography` .