

NDA / NA EXAMINATION

GEOGRAPHY

COMPLETE STUDY NOTES + 50 PRACTICE MCQs

DEFENCE_DREAMS

English Medium | Concept Notes | India & World Geography | Practice Set | Answer Key

Prepared for focused revision of the Geography portion of the UPSC NDA & Naval Academy General Ability Test (GAT).

Use the notes to build concepts, revise facts, practise map-based thinking and then attempt the MCQs without looking at the answer key.

How to Use This Booklet

- **Step 1 — Learn:** Read each topic and understand the process behind the facts.
- **Step 2 — Revise:** Revisit the quick-revision points and location associations.
- **Step 3 — Practise:** Attempt all 50 MCQs under timed conditions.
- **Step 4 — Analyse:** Check the answer key at the end and revise every incorrect response.

Exam note: Geography is one part of GAT General Knowledge. The official syllabus gives a broad scope rather than an exhaustive list. This booklet is a foundation resource; combine it with an atlas, NCERT-level reading, previous-year papers and current updates.

Accuracy note: Physical geography principles are stable, but economic facts such as trade composition, port rankings and transport infrastructure can change. Verify such current details from recent official sources before the examination.

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1. The Earth: Shape, Size and Origin

Earth is the third planet from the Sun and the only known planet that supports abundant life. It is nearly spherical, but not a perfect sphere. Rotation causes a slight bulge at the equator and flattening at the poles; this shape is called an oblate spheroid or, more precisely, a geoid.

Important facts

- Mean radius: about 6,371 km; equatorial radius is slightly larger than polar radius.
- Equatorial circumference: about 40,075 km; meridional circumference: about 40,008 km.
- Earth's axis is tilted about 23.5° from the perpendicular to the plane of its orbit (equivalently, 66.5° to the orbital plane).
- Earth is about 150 million km from the Sun on average; this mean distance is one Astronomical Unit (AU).
- The Earth formed about 4.54 billion years ago. The early Earth was very hot; denser materials sank inward while lighter materials rose.

Origin of the Earth

The modern nebular model explains the Solar System as having formed from a rotating cloud of gas and dust. Gravity caused the cloud to contract and flatten into a disc. The Sun formed near the centre, while dust and rocky material collided and accreted to form planetesimals and, eventually, planets. Earth differentiated into layers as dense iron-rich material moved towards the centre.

Earth's major spheres

- **Lithosphere:** the rigid outer part of Earth, including the crust and uppermost mantle.
- **Hydrosphere:** all water on, under and above Earth's surface.
- **Atmosphere:** the envelope of gases surrounding Earth.
- **Biosphere:** the zone where life exists and interacts with land, water and air.

2. Latitudes, Longitudes and Time

Latitudes

Latitude is the angular distance of a place north or south of the Equator, measured from Earth's centre. Parallels of latitude run east–west and never meet. The Equator is 0° latitude; the poles are 90° north and 90° south.

- Equator: 0°; Tropic of Cancer: 23.5° N; Tropic of Capricorn: 23.5° S.
- Arctic Circle: 66.5° N; Antarctic Circle: 66.5° S.
- Latitude helps determine the angle of incoming sunlight and therefore influences temperature and climate.
- One degree of latitude is approximately 111 km on the ground.

Longitudes

Longitude is the angular distance east or west of the Prime Meridian (0°), which passes through Greenwich, United Kingdom. Meridians run from pole to pole and converge at the poles. There are 360° of longitude.

- 15° of longitude corresponds to one hour of time; 1° corresponds to four minutes.
- Places east of Greenwich are ahead in local time; places west are behind.
- The 180° meridian is broadly associated with the International Date Line (IDL), but the IDL bends to avoid splitting countries and island groups.

Time zones and Indian Standard Time

A country may use one standard time for administrative convenience even though local solar time varies from east to west. India uses Indian Standard Time (IST), based on 82°30′ E longitude, which is 5 hours 30 minutes ahead of Coordinated Universal Time (UTC+5:30). The standard meridian passes near Mirzapur in Uttar Pradesh.

International Date Line

Crossing the IDL westward generally adds one calendar day; crossing it eastward generally subtracts one day. The line is not perfectly straight because it follows political and practical boundaries.

3. Motions of the Earth and Their Effects

Rotation

Rotation is the spinning of Earth on its axis from west to east. One rotation relative to the Sun takes about 24 hours (solar day); relative to distant stars it takes about 23 hours 56 minutes (sidereal day).

- Causes day and night and the apparent east-to-west movement of the Sun.
- Produces the Coriolis effect: moving air and water are deflected to the right in the Northern Hemisphere and to the left in the Southern Hemisphere.
- Contributes to the equatorial bulge and polar flattening.
- Places generally experience sunrise earlier in the east than in the west.

Revolution

Revolution is Earth's orbital movement around the Sun. One revolution takes about 365¼ days. The extra quarter-day is adjusted by adding a leap day in a leap year (with century-year exceptions unless divisible by 400).

- Earth's axial tilt plus revolution causes seasons and changes in the length of day and night.
- Around 21 June, the Northern Hemisphere has its summer solstice; the Sun's direct rays fall near the Tropic of Cancer.
- Around 22 December, the Northern Hemisphere has its winter solstice; direct rays fall near the Tropic of Capricorn.
- Around 20–21 March and 22–23 September, equinoxes occur; day and night are nearly equal worldwide.

Remember: Seasons are not caused by Earth's changing distance from the Sun. They are primarily caused by axial tilt and revolution.

4. Interior of the Earth, Rocks and Landforms

Interior structure

- **Crust:** the thin, outer solid layer. Continental crust is generally thicker and less dense than oceanic crust.
- **Mantle:** extends to about 2,900 km depth. It is mostly solid rock that can flow very slowly over geological time.
- **Outer core:** liquid iron and nickel; movement of conductive liquid metal helps generate Earth's magnetic field.
- **Inner core:** solid iron-rich sphere, solid mainly because of immense pressure.

Rocks and the rock cycle

A rock is a natural aggregate of one or more minerals. Rocks are grouped by how they form.

- **Igneous:** formed when magma or lava cools. Intrusive rocks cool slowly underground and often have large crystals (e.g., granite); extrusive rocks cool rapidly at the surface (e.g., basalt).
- **Sedimentary:** formed by deposition, compaction and cementation of sediments, or by chemical/organic accumulation. Examples: sandstone, shale and limestone. Fossils are commonly found in sedimentary rocks.

- **Metamorphic:** existing rocks altered by heat, pressure and chemically active fluids without completely melting. Examples: marble from limestone; slate from shale; gneiss from high-grade metamorphism.

The rock cycle is continuous: rocks can be weathered into sediments, buried and lithified, metamorphosed, melted into magma and cooled again.

Major landforms

- **Mountains:** high relief features formed by folding, faulting or volcanism. Fold mountains include the Himalayas.
- **Plateaus:** elevated areas with relatively flat tops; examples include the Deccan Plateau and Tibetan Plateau.
- **Plains:** low-relief areas, often formed by river deposition; the Northern Plains of India are an alluvial plain.

5. Weathering, Earthquakes and Volcanoes

Weathering and erosion

Weathering is the breakdown or alteration of rock in place. Erosion is the removal and transport of weathered material by agents such as rivers, wind, glaciers and waves.

- **Mechanical weathering:** physical disintegration without major chemical change. Causes include freeze–thaw action, heating and cooling, salt crystallisation and pressure release.
- **Chemical weathering:** decomposition or alteration of minerals through processes such as oxidation, carbonation, hydrolysis and solution. It is generally faster in warm, wet climates.
- **Biological weathering:** breakdown caused by plant roots, burrowing organisms and organic acids.

Earthquakes

An earthquake is the shaking of the ground caused by sudden energy release, commonly along faults. The focus (hypocentre) is the point inside Earth where rupture begins; the epicentre is the point on the surface directly above it.

- Most damaging earthquakes occur near tectonic plate boundaries, though intraplate earthquakes also occur.
- Seismic waves include P-waves (fast, travel through solids and liquids), S-waves (travel through solids only) and surface waves (often highly damaging).

- Magnitude describes earthquake size/energy release; intensity describes observed effects and damage at a location.
- A tsunami may be generated by sudden displacement of the sea floor, commonly during a large undersea earthquake.

Volcanoes

A volcano is an opening through which magma, gases and ash reach the surface. Magma is molten rock below the surface; lava is molten rock that has erupted.

- Shield volcanoes: broad, gently sloping, usually formed by fluid basaltic lava.
- Composite/stratovolcanoes: steep-sided, layered structures that can produce explosive eruptions.
- Cinder cones: relatively small cones built mainly from erupted fragments.
- The Pacific Ring of Fire is a major belt of earthquakes and volcanoes around the Pacific Ocean.

6. Atmosphere: Composition and Structure

The atmosphere is a mixture of gases held by Earth's gravity. Dry air near the surface contains approximately 78% nitrogen and 21% oxygen, with about 0.93% argon and roughly 0.04% carbon dioxide; water vapour is variable.

Layers of the atmosphere

- **Troposphere:** lowest layer; most weather and water vapour occur here. Temperature generally decreases with height.
- **Stratosphere:** contains the ozone layer, which absorbs much of the Sun's harmful ultraviolet radiation. Temperature generally rises with height.
- **Mesosphere:** temperature decreases with height; many meteors burn up here.
- **Thermosphere:** very thin air and high temperatures; auroras occur in this region.
- **Exosphere:** outermost, extremely rarefied transition towards space.

The tropopause, stratopause and mesopause are boundaries between the main atmospheric layers. Their heights vary with latitude and season.

7. Insolation, Temperature and Pressure

Insolation and heat budget

Insolation is incoming solar radiation. Its intensity varies with latitude, season, time of day, cloud cover, altitude and surface characteristics. Earth receives short-wave solar

energy and emits long-wave terrestrial radiation. Greenhouse gases absorb and re-emit some outgoing long-wave radiation, keeping the lower atmosphere warmer than it would otherwise be.

- The angle of incidence matters: more direct rays concentrate energy over a smaller area.
- Land heats and cools faster than water; this helps create coastal temperature contrasts and local breezes.
- Clouds can reflect incoming sunlight but also absorb outgoing terrestrial radiation.
- Temperature generally decreases with altitude in the troposphere at an average environmental lapse rate near 6.5°C per km, though actual rates vary.

Atmospheric pressure

Atmospheric pressure is the force exerted by the weight of air per unit area. It is measured with a barometer. Pressure generally decreases with altitude because the air column above becomes smaller.

- Warm air expands, becomes less dense and tends to rise, creating relatively low surface pressure.
- Cold air is denser and tends to sink, favouring relatively high surface pressure.
- Pressure differences drive winds from high-pressure towards low-pressure areas, modified by Earth's rotation and friction.

Global pressure belts

- Equatorial low-pressure belt (doldrums): warm rising air and frequent convection.
- Subtropical high-pressure belts near 30° N and 30° S: descending air, often associated with deserts.
- Subpolar low-pressure belts near 60° N and 60° S: convergence of contrasting air masses.
- Polar high-pressure areas: cold, dense, descending air.

8. Planetary Winds, Cyclones and Anticyclones

Planetary winds

- **Trade winds:** blow from subtropical highs towards the equatorial low; north-east trades in the Northern Hemisphere and south-east trades in the Southern Hemisphere.
- **Westerlies:** blow from subtropical highs towards subpolar lows; generally west to east in the mid-latitudes.

- **Polar easterlies:** cold winds flowing outward from polar highs towards subpolar lows.
- **Monsoon winds:** seasonal reversal of wind direction caused by differential heating of land and sea and other atmospheric influences.

Local and periodic winds

- Sea breeze: daytime wind from sea to land as land heats faster.
- Land breeze: night-time wind from land to sea as land cools faster.
- Mountain/valley breezes: daytime upslope and night-time downslope flows under typical fair-weather conditions.
- Loo: hot, dry summer wind over parts of north-western and northern India.

Cyclones and anticyclones

A cyclone is a low-pressure system with winds spiralling inward near the surface. An anticyclone is a high-pressure system with winds generally spiralling outward near the surface.

- In the Northern Hemisphere, cyclones rotate anticlockwise and anticyclones clockwise; directions reverse in the Southern Hemisphere.
- Tropical cyclones develop over warm oceans, require sufficient Coriolis force, moist unstable air and low vertical wind shear. They weaken over land or cooler water.
- Temperate/extratropical cyclones are associated with fronts and contrasting air masses in the mid-latitudes.
- A tropical cyclone is called a hurricane in the Atlantic and north-eastern Pacific, a typhoon in the north-western Pacific, and a cyclone in the Indian Ocean and South Pacific.

9. Humidity, Clouds and Precipitation

Humidity is the amount of water vapour in the air. Relative humidity is the ratio of actual water vapour present to the maximum amount the air can hold at the same temperature, expressed as a percentage.

- Evaporation adds water vapour to the atmosphere; transpiration releases water vapour from plants.
- When air cools to its dew point, it may become saturated and condensation can occur.
- Condensation nuclei such as dust and salt particles help tiny water droplets form.
- Clouds are visible collections of tiny water droplets and/or ice crystals.

Main cloud families

- Cirrus: high, thin, wispy clouds, mostly ice crystals.
- Cumulus: heap-like clouds; fair-weather cumulus are often small, but strong vertical growth can produce storms.
- Stratus: widespread layered clouds, often producing dull skies or drizzle.
- Nimbus indicates precipitation-bearing cloud; cumulonimbus clouds are associated with thunderstorms and heavy showers.

Types of rainfall

- **Convectional:** surface heating causes warm moist air to rise, cool and condense; common in equatorial regions.
- **Orographic/relief:** moist air is forced up a mountain slope, cools and rains on the windward side; the leeward side may lie in a rain shadow.
- **Cyclonic/frontal:** associated with uplift along fronts or low-pressure systems.

10. Climate and Major Natural Regions

Weather describes short-term atmospheric conditions; climate is the long-term pattern of weather, commonly assessed over 30-year periods. Climate is influenced by latitude, altitude, distance from the sea, ocean currents, relief, prevailing winds and pressure systems.

Broad world climate regions

- **Equatorial:** hot and wet throughout the year; evergreen forests; examples include the Amazon Basin and Congo Basin.
- **Tropical monsoon:** seasonal rainfall with a distinct wet and dry season; parts of South and Southeast Asia.
- **Savanna:** tropical grassland with scattered trees and distinct wet/dry seasons; parts of Africa and South America.
- **Hot desert:** very low rainfall and high evaporation; Sahara, Arabian and Australian deserts.
- **Mediterranean:** hot, dry summers and mild, wetter winters; Mediterranean Basin, California, central Chile, Cape region and south-western Australia.
- **Temperate maritime:** moderate temperatures and rainfall through much of the year; western Europe and similar west-coast settings.
- **Continental:** large seasonal temperature range, especially in interiors of large continents.

- **Polar/tundra:** very cold; short growing season; tundra vegetation includes mosses, lichens and low shrubs.

Natural vegetation

Natural vegetation is shaped by temperature, rainfall, soil, relief and human activity. Forests generally occur where moisture is adequate; grasslands often occur where rainfall is seasonal or moderate; deserts support sparse drought-adapted plants; tundra supports low-growing vegetation.

11. Oceans: Currents, Tides and Salinity

Ocean currents

Ocean currents are large-scale movements of seawater. Surface currents are driven mainly by prevailing winds, Earth's rotation and the arrangement of continents. Deep currents are driven largely by differences in water density caused by temperature and salinity (thermohaline circulation).

- Warm currents generally move heat poleward; cold currents generally move cooler water equatorward.
- The Gulf Stream and North Atlantic Drift help moderate the climate of western Europe.
- The cold Labrador Current meets the warm Gulf Stream near the Grand Banks, creating rich fishing grounds and fog.
- The cold Humboldt (Peru) Current supports nutrient-rich upwelling off western South America.
- The cold Benguela Current influences the arid west coast of southern Africa.
- The Kuroshio is a warm current flowing north-eastward near Japan; the Oyashio is a cold current from subarctic waters.

Tides

Tides are periodic rises and falls of sea level caused mainly by the gravitational attraction of the Moon and, to a lesser extent, the Sun, along with Earth's rotation.

- Spring tides occur near new moon and full moon when the Sun, Moon and Earth are approximately aligned; tidal range is greatest.
- Neap tides occur near the first and third quarter moons when the Sun and Moon pull at right angles; tidal range is smaller.
- High tide and low tide timings vary by location and coastline shape.

Salinity

Average ocean salinity is about 35 parts per thousand (35‰), though it varies. High evaporation and low rainfall can increase salinity; heavy rainfall, river inflow and melting ice can reduce it. Semi-enclosed seas in dry regions can have high salinity.

12. India: Location, Relief and Drainage

Location and extent

- India lies in the Northern and Eastern Hemispheres, in South Asia.
- The mainland extends approximately from 8°4′ N to 37°6′ N latitude and 68°7′ E to 97°25′ E longitude.
- The Tropic of Cancer (23°30′ N) passes through eight Indian states: Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura and Mizoram.
- India's Standard Meridian is 82°30′ E. The Andaman and Nicobar Islands lie to the south-east; Lakshadweep lies in the Arabian Sea.

Major physiographic divisions

- **The Himalayas:** young fold mountains in the north; major parallel ranges include the Greater Himalaya (Himadri), Lesser Himalaya (Himachal) and Shiwalik.
- **Northern Plains:** formed by alluvium deposited by the Indus, Ganga and Brahmaputra river systems and their tributaries.
- **Peninsular Plateau:** ancient, stable block of hard crystalline rocks; includes the Central Highlands and Deccan Plateau.
- **Indian Desert:** Thar Desert in the north-west, with low rainfall and inland drainage in several areas.
- **Coastal Plains:** western coastal plain is generally narrower; eastern coastal plain is generally broader and has large deltas.
- **Islands:** Andaman and Nicobar in the Bay of Bengal; Lakshadweep in the Arabian Sea.

Major river systems

- **Himalayan rivers:** generally perennial because they are fed by rain and snow/glacier melt. Indus, Ganga and Brahmaputra are major systems.
- **Peninsular rivers:** largely rain-fed and more seasonal. Godavari, Krishna, Kaveri and Mahanadi generally flow east into the Bay of Bengal.
- Narmada and Tapi flow west through rift valleys and drain into the Arabian Sea.

- The Godavari is the largest peninsular river system by basin area and is often called the Dakshin Ganga.

13. Indian Climate and Natural Vegetation

Monsoon mechanism

India has a monsoon-type climate. Seasonal reversal of winds is linked to differential heating of land and sea, shifting pressure belts, the seasonal movement of the Inter-Tropical Convergence Zone (ITCZ), the Tibetan Plateau, and upper-air circulation. The South-West Monsoon normally brings most of India's annual rainfall.

- Arabian Sea branch and Bay of Bengal branch are the two major branches of the South-West Monsoon.
- The Western Ghats receive heavy orographic rainfall on their windward side; areas east of the Ghats lie partly in a rain shadow.
- The north-east monsoon (retreating monsoon) brings important rainfall to Tamil Nadu and parts of the south-east coast, especially during October–December.
- Western disturbances bring winter precipitation to north-western India and snowfall in the western Himalayas.
- Rainfall is highly uneven: the western coast and north-eastern hills receive very high rainfall, while western Rajasthan and parts of the Deccan interior are relatively dry.

Natural vegetation types in India

- **Tropical evergreen:** heavy rainfall areas of the Western Ghats, north-east India and Andaman and Nicobar Islands.
- **Tropical deciduous:** widespread monsoon forests; trees shed leaves in the dry season. Teak and sal are important examples.
- **Thorn and scrub:** arid and semi-arid regions of Rajasthan, Gujarat and parts of the Deccan.
- **Montane:** vegetation changes with altitude in the Himalayas, from subtropical forests to temperate conifers and alpine meadows.
- **Mangrove/tidal:** saline coastal wetlands and deltas; Sundarbans is a major mangrove region.

14. Indian Soils, Agriculture and Irrigation

Major soil groups

- **Alluvial:** river-deposited soil of the Northern Plains and many coastal/deltaic areas; generally fertile and important for rice, wheat and sugarcane.
- **Black (regur):** clay-rich soil developed largely over Deccan Trap basalt; retains moisture and is associated with cotton cultivation.
- **Red and yellow:** colour mainly due to iron compounds; common in parts of the Peninsular Plateau.
- **Laterite:** develops under high temperature and heavy rainfall with intense leaching; can support plantation crops with suitable management.
- **Arid:** sandy, often saline and low in humus; found in dry western India.
- **Forest/mountain:** vary with altitude, slope and vegetation in hilly regions.

Cropping seasons

- **Kharif:** sown with the onset of the monsoon and harvested around autumn; rice, maize, cotton, jute and millets are common examples.
- **Rabi:** sown in winter and harvested in spring; wheat, barley, gram, peas and mustard are common examples.
- **Zaid:** short summer season between rabi and kharif; examples include watermelon, cucumber and some vegetables.

Agriculture and irrigation

Agriculture depends on rainfall, soil, temperature, relief, irrigation, inputs, markets and technology. Irrigation sources include canals, wells, tube wells, tanks and micro-irrigation systems such as drip and sprinklers. Drip irrigation delivers water near plant roots and can reduce water loss.

- Rice generally needs high temperature and abundant water; wheat prefers cool growing conditions and warmer, dry weather for ripening.
- Tea grows well in warm, humid regions with well-distributed rainfall and well-drained slopes; major areas include Assam, West Bengal and parts of south India.
- Coffee is concentrated in the southern hill regions, especially Karnataka, Kerala and Tamil Nadu.
- Jute is associated with the warm, humid Ganga-Brahmaputra deltaic region.
- Millets such as bajra and jowar are relatively drought tolerant.

15. Minerals, Energy and Industries

Mineral resources

- Iron ore is a key raw material for the iron and steel industry. Major producing belts include Odisha–Jharkhand, Chhattisgarh, Karnataka and Goa.
- Bauxite is the principal ore of aluminium; major deposits occur in Odisha and several other plateau regions.
- Manganese is used in steel-making and other industries.
- Mica has electrical and industrial uses; deposits occur in parts of Jharkhand, Bihar, Andhra Pradesh and Rajasthan.
- Limestone is essential for cement and is widely distributed in several states.

Conventional and non-conventional energy

- **Coal:** major thermal power fuel; important coalfields include Jharia, Raniganj, Bokaro, Talcher and Korba.
- **Petroleum and natural gas:** important areas include Mumbai Offshore, Assam, Gujarat, Rajasthan and the Krishna-Godavari basin.
- **Hydroelectricity:** generated from flowing or stored water; potential is significant in Himalayan and Western Ghats river systems.
- **Solar:** strong potential in arid and semi-arid regions, especially Rajasthan and Gujarat.
- **Wind:** important potential in Tamil Nadu, Gujarat, Karnataka, Maharashtra and Rajasthan.
- **Nuclear:** generated using nuclear fuels at designated power stations; it is a low-carbon source during operation but requires careful safety and waste management.

Industrial location factors

Industries choose locations based on raw materials, power, water, labour, capital, transport, markets, technology and government policy. Heavy industries often benefit from proximity to raw materials and transport; consumer industries may prefer proximity to large markets.

- Iron and steel: traditional centres include Jamshedpur, Bhilai, Rourkela, Bokaro, Durgapur and Visakhapatnam.
- Cotton textiles: important centres include Mumbai, Ahmedabad, Surat, Coimbatore and parts of Maharashtra and Gujarat.
- IT and software services: major clusters include Bengaluru, Hyderabad, Pune, Chennai, Gurugram and Noida.

16. Transport, Ports, Routes, Imports and Exports

Transport network

- **Roadways:** provide door-to-door connectivity and are important for short and medium distances. National Highways connect major cities, ports and strategic regions.
- **Railways:** carry large volumes of passengers and freight over long distances; route density is higher in the northern plains than in difficult mountainous terrain.
- **Airways:** provide fast long-distance connectivity and are important for remote, hilly and island regions as well as international links.
- **Waterways:** include inland waterways and coastal shipping; they can move bulky cargo efficiently where navigable routes and terminals exist.

Major seaports of India

For exam preparation, learn the port's coast and state as well as its broad hinterland. Port names, administrative status and cargo rankings may change; check the latest official port information.

- **West coast:** Deendayal (Kandla) in Gujarat; Mumbai and Jawaharlal Nehru Port (Nhava Sheva) in Maharashtra; Mormugao in Goa; New Mangalore in Karnataka; Cochin in Kerala.
- **East coast:** Chennai and Kamarajar (Ennore) in Tamil Nadu; V.O. Chidambaranar (Tuticorin) in Tamil Nadu; Visakhapatnam in Andhra Pradesh; Paradip in Odisha; Syama Prasad Mookerjee Port (Kolkata–Haldia) in West Bengal.

International sea routes and trade

India's location in the northern Indian Ocean places it near major sea lanes connecting Europe, West Asia and Africa with East and Southeast Asia. The Suez Canal route links the Mediterranean with the Red Sea; the Strait of Hormuz is strategically important for energy shipments; the Strait of Malacca is a major passage between the Indian and Pacific Oceans.

India's major export categories commonly include engineering goods, petroleum products, pharmaceuticals, gems and jewellery, chemicals, textiles and agricultural products. Major import categories commonly include crude petroleum, gold, machinery, electronics, chemicals and certain fertilisers. The exact ranking and values change year to year.

Air and land connectivity

Important international airports include Delhi, Mumbai, Bengaluru, Hyderabad, Chennai, Kolkata and Kochi, among others. India's land connectivity with neighbouring countries is shaped by mountain passes, border roads, rail links and designated trade corridors. For current routes and operational status, consult official transport and

customs updates.

17. Map Skills and High-Yield Revision

Map practice checklist

- Mark the Tropic of Cancer, Standard Meridian, Equator and major latitudes/longitudes.
- Locate the Himalayas, Aravalli, Vindhya, Satpura, Western Ghats and Eastern Ghats.
- Trace the Indus, Ganga, Brahmaputra, Godavari, Krishna, Kaveri, Narmada and Tapi.
- Locate the Thar Desert, Deccan Plateau, Northern Plains, Western Coastal Plain and Eastern Coastal Plain.
- Practise the states crossed by the Tropic of Cancer and the states/UTs associated with major ports.
- On a world map, locate the Pacific Ring of Fire, Sahara, Amazon Basin, Congo Basin, major ocean currents, Suez Canal, Strait of Hormuz and Strait of Malacca.

Fast facts to remember

- 0° longitude: Prime Meridian; 0° latitude: Equator.
- 15° longitude = 1 hour; 1° longitude = 4 minutes.
- IST = UTC + 5:30; Standard Meridian = 82°30′ E.
- Rotation causes day and night; revolution plus axial tilt causes seasons.
- P-waves travel through solids and liquids; S-waves travel through solids only.
- Ozone layer is concentrated in the stratosphere.
- Trade winds blow towards the equatorial low; westerlies dominate the mid-latitudes.
- Spring tides: new and full moon; neap tides: first and third quarter.
- Black soil is moisture-retentive and associated with cotton; alluvial soil dominates the Northern Plains.
- Narmada and Tapi flow west; most major Peninsular rivers flow east.

18. Practice Set: 50 Multiple-Choice Questions

Instructions: Choose the one best answer for each question. Each question has four options. The answer key is placed after Question 50. Try to complete the set in 45–50 minutes.

1. Which statement best describes the shape of the Earth?

A. Perfect sphere

B. Oblate spheroid

C. Flat disc

D. Prolate spheroid

2. The approximate mean radius of the Earth is:

A. 3,371 km

B. 5,371 km

C. 6,371 km

D. 8,371 km

3. The Prime Meridian is located at:

A. 0° latitude

B. 0° longitude

C. 90° E longitude

D. 180° longitude

4. The Tropic of Cancer is located at:

A. 23.5° N

B. 23.5° S

C. 66.5° N

D. 0°

5. A difference of 15° longitude corresponds to a time difference of:

A. 15 minutes

B. 30 minutes

C. 1 hour

D. 2 hours

6. Indian Standard Time is based on which longitude?

A. 75° E

B. 82°30′ E

C. 90° E

D. 97°30′ E

7. The International Date Line broadly follows which meridian?

A. 0°

B. 90° E

C. 90° W

D. 180°

8. The primary cause of day and night is Earth's:

A. Revolution

B. Rotation

C. Axial tilt

D. Precession

9. The Northern Hemisphere experiences its summer solstice around:

A. 21 March

B. 21 June

C. 23 September

D. 22 December

10. Which of the following is an intrusive igneous rock?

A. Basalt

B. Granite

C. Sandstone

D. Marble

11. Fossils are most commonly preserved in:

A. Igneous rocks

B. Sedimentary rocks

C. Metamorphic rocks

D. Mantle rocks

12. Marble is formed from the metamorphism of:

A. Granite

B. Basalt

C. Limestone

D. Sandstone

13. The point inside the Earth where an earthquake begins is called the:

A. Epicentre

B. Focus

C. Crater

D. Fault scarp

14. Which seismic wave cannot travel through liquids?

A. P-wave

B. S-wave

C. Both P and S waves

D. Neither P nor S wave

15. The Pacific Ring of Fire is especially known for:

A. Coral reefs only

B. Earthquakes and volcanoes

C. Polar ice caps

D. Desert dunes

16. Most weather phenomena occur in the:

A. Troposphere

B. Stratosphere

C. Mesosphere

D. Exosphere

17. The ozone layer is mainly found in the:

A. Troposphere

B. Stratosphere

C. Mesosphere

D. Exosphere

18. The most abundant gas in dry air is:

A. Oxygen

B. Carbon dioxide

C. Nitrogen

D. Argon

19. Atmospheric pressure is measured using a:

A. Hygrometer

B. Barometer

C. Anemometer

D. Seismograph

20. The Coriolis effect deflects moving air to the right in the:

A. Southern Hemisphere

B. Northern Hemisphere

C. Equatorial zone only

D. Both hemispheres equally

21. Trade winds generally blow from:

A. Equatorial low to polar high

B. Subtropical highs towards the equatorial low

C. Polar highs to subtropical highs

D. Subpolar lows to the Equator only

22. In the Northern Hemisphere, a tropical cyclone rotates:

A. Clockwise

B. Anticlockwise

C. Only eastward

D. Without a fixed direction

23. A sea breeze usually blows:

A. From land to sea during the day

B. From sea to land during the day

C. From sea to land at midnight only

D. From poles to Equator

24. Relative humidity is expressed as:

A. Kilometres per hour

B. A percentage

C. Degrees Celsius

D. Millibars only

25. Rainfall caused when moist air is forced to rise over a mountain is:

A. Convectional

B. Orographic

C. Frontal only

D. Artificial

26. Which cloud type is commonly associated with thunderstorms?

A. Cirrus

B. Stratus

C. Cumulonimbus

D. Cirrostratus

27. The Mediterranean climate is characterised by:

A. Wet summers and dry winters

B. Dry summers and wet winters

C. Rain throughout the year with no seasonality

D. Permanent frost

28. The Amazon Basin is associated mainly with which natural region?

A. Equatorial rainforest

B. Tundra

C. Hot desert

D. Mediterranean scrub

29. Spring tides occur during:

A. First and third quarter moons

B. New moon and full moon

C. Only solar eclipses

D. Every afternoon

30. The Gulf Stream is a:

A. Cold current

B. Warm current

C. Tidal bore

D. Deep ocean trench

31. The cold Humboldt Current flows along the western coast of:

A. India

B. South America

C. Japan

D. Norway

32. Average ocean salinity is approximately:

A. 5‰

B. 15‰

C. 25‰

D. 35‰

33. The Tropic of Cancer passes through how many Indian states?

A. Six

B. Seven

C. Eight

D. Nine

34. Which of the following rivers flows westward into the Arabian Sea?

A. Godavari

B. Krishna

C. Narmada

D. Mahanadi

35. The Northern Plains of India have been formed mainly by:

A. Volcanic lava

B. River alluvium

C. Glacial moraine alone

D. Wind deposition alone

36. Which is the largest peninsular river system by basin area?

A. Kaveri

B. Godavari

C. Tapi

D. Sabarmati

37. The Western Ghats receive heavy rainfall mainly due to:

A. Convection only

B. Orographic uplift of monsoon winds

C. Polar easterlies

D. Western disturbances only

38. The retreating or north-east monsoon gives significant rainfall to:

A. Punjab

B. Tamil Nadu coast

C. Ladakh

D. Western Rajasthan

39. Mangrove forests are especially associated with:

A. High mountain slopes

B. Tidal coastal wetlands and deltas

C. Cold deserts

D. Interior dry plateaus

40. Black soil is particularly suitable for:

A. Jute

B. Cotton

C. Tea

D. Coconut

41. Which crop is generally classified as a rabi crop?

A. Rice

B. Cotton

C. Wheat

D. Jute

42. The principal ore of aluminium is:

A. Hematite

B. Bauxite

C. Mica

D. Limestone

43. Jharia coalfield is located in:

A. Jharkhand

B. Kerala

C. Punjab

D. Assam

44. Which of the following is a non-conventional renewable energy source?

A. Coal

B. Petroleum

C. Solar energy

D. Natural gas

45. The Strait of Malacca connects the Andaman Sea region with the:

A. Mediterranean Sea

B. South China Sea

C. Black Sea

D. Red Sea

46. Deendayal (Kandla) Port is located in:

A. Gujarat

B. Odisha

C. Kerala

D. West Bengal

47. Which port is located on the east coast of India?

A. Mormugao

B. New Mangalore

C. Paradip

D. Cochin

48. Which pair of rivers flows through rift valleys towards the Arabian Sea?

A. Ganga and Yamuna

B. Narmada and Tapi

C. Godavari and Krishna

D. Mahanadi and Kaveri

49. Which factor is the main cause of seasons on Earth?

A. Earth's daily rotation alone

B. Axial tilt combined with revolution

C. Ocean tides

D. Changes in atmospheric pressure

50. Which statement about S-waves is correct?

A. They travel through solids and liquids

B. They travel only through liquids

C. They travel through solids but not liquids

D. They are electromagnetic waves

19. Answer Key

Check your responses only after completing the full practice set. Review the relevant notes for every incorrect answer.

Q. No.	Answer	Q. No.	Answer	Q. No.	Answer
1	B	18	C	35	B
2	C	19	B	36	B
3	B	20	B	37	B
4	A	21	B	38	B
5	C	22	B	39	B
6	B	23	B	40	B
7	D	24	B	41	C
8	B	25	B	42	B
9	B	26	C	43	A
10	B	27	B	44	C
11	B	28	A	45	B
12	C	29	B	46	A
13	B	30	B	47	C
14	B	31	B	48	B
15	B	32	D	49	B
16	A	33	C	50	C
17	B	34	C		

Suggested revision plan

- Day 1: Earth, coordinates, time and motions.
- Day 2: Rocks, landforms, weathering, earthquakes and volcanoes.
- Day 3: Atmosphere, pressure, winds, cyclones and rainfall.
- Day 4: Climate, natural regions, oceans and currents.
- Day 5: India — relief, rivers, climate, soils and agriculture.

- Day 6: Resources, industries, transport and ports; practise maps.
- Day 7: Attempt the 50 MCQs again and revise weak areas.