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CUET · GEOGRAPHY · CLASS XII · CODE 313

Transport and Communication

CUET unit: Tertiary and Quaternary Activities

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📌 Snapshot

- Transport, communication and trade are the tertiary-sector services that link producing centres with consuming centres and enable mass production and exchange.
- There are four principal modes of transport — land (roads, railways, pipelines, ropeways), water (ocean and inland), air, and pipelines — each with its own cost and suitability.
- Major transport networks span the world: highways, trans-continental railways (Trans-Siberian, Trans-Canadian, Australian Trans-Continental, Orient Express, Union & Pacific), important sea routes (Big Trunk Route, Cape, Mediterranean–Indian, North & South Pacific), shipping canals (Suez, Panama) and inland waterways (Rhine, Danube, Volga, St. Lawrence, Mississippi).
- Communications evolve from telegraph and telephone to satellite communication, optic fibre cables (OFC), Internet and cyberspace — the backbone of the "global village".
- Tested in CUET as a fact-dense unit on tertiary/quaternary activities: place identifications, route end-points, gauge/density figures, and canal/pipeline facts dominate.

📖 Detailed Notes

2.1 Core concepts

- Transport is an organised service industry providing carriage of persons and goods over land, water and air using humans, animals and vehicles; it includes arteries, vehicles and organisation for loading/unloading and delivery (NCERT §Transport, p. 54).
- A **transport network** is several places (nodes) joined together by a series of routes (links) to form a pattern (NCERT box, p. 54).
- The principal modes of world transportation are **land, water, air and pipelines**; each mode (except pipelines) carries both passengers and freight, and significance depends on goods, cost and mode available (NCERT §Modes of Transportation, p. 54–55).
- International movement of goods is mostly by ocean freighters; road is cheaper/faster for short distances and door-to-door; railways suit large volumes of bulky

materials over long distances within a country; airways carry high-value, light and perishable goods (NCERT §Modes of Transportation, p. 55).

- Land transport evolved from human porters and pack animals (horses, mules, camels, dogs, reindeer, bullocks) to carts/wagons after the invention of the wheel, and was revolutionised by the steam engine; the first public railway opened in 1825 between **Stockton and Darlington** in northern England (NCERT §Land Transport, p. 55).
- The internal combustion engine revolutionised road transport; newer land-transport forms include pipelines, ropeways and cableways. Liquids like mineral oil, water, sludge and sewers are moved by pipelines (NCERT §Land Transport, p. 55).
- World's total motorable road length is about **15 million km**, of which **North America accounts for 33 per cent**; highest road density and highest number of vehicles are in North America compared to Western Europe (NCERT §Roads, p. 56).
- **Highways** are metalled roads connecting distant places, **80 m wide** with separate lanes, bridges, flyovers and dual carriageways. In North America highway density is about **0.65 km per sq km** and every place is within 20 km of a highway (NCERT §Highways, p. 56).
- Major highways: Trans-Canadian (Vancouver to St. John's City), Alaskan (Edmonton to Anchorage), Pan-American (under construction, will connect South, Central and North America), Trans-Continental Stuart Highway (Darwin to Melbourne via Tennant Creek and Alice Springs), Moscow–Vladivostok (Russia), Chengdu–Lhasa (China–Tibet), Golden Quadrilateral / Super Expressway in India (Delhi–Mumbai–Chennai–Kolkata), Algiers–Conakry and Cairo–Cape Town in Africa (NCERT §Highways, p. 57).
- **Border roads** are roads laid along international boundaries; they integrate remote areas with major cities and serve defence (NCERT §Border Roads, p. 57).
- Railway gauges: **broad (more than 1.5 m), standard (1.44 m), metre (1 m) and smaller gauges**; standard gauge is used in U.K. The world has about **13 lakh km** of railways open for traffic. Europe has about **4,40,000 km** of railways, mostly double or multiple tracked; **Belgium has the highest density** — 1 km per 6.5 sq km (NCERT §Railways, p. 57–58).
- Russia has very dense network west of the Urals; railways carry **90 per cent** of the country's total transport. North America has nearly **40 per cent of the world's total** rail network, densest in industrialised east-central U.S.A. and adjoining Canada (NCERT §Railways, p. 58).
- Australia has about 40,000 km of railways, **25 per cent in New South Wales**; west-east Australian National Railway links Perth to Sydney. South America's dense rail networks are in the Pampas of Argentina and the coffee region of Brazil (together **40 per cent** of route length); only one trans-continental rail route links Buenos Aires with Valparaiso through Uspallatta Pass (3,900 m) (NCERT §Railways, p. 58).
- Africa has only 40,000 km of railways; South Africa alone has 18,000 km. Key African railways: Benguela (Angola to Katanga–Zambia Copper Belt); Tanzania

(Zambian Copper Belt to Dar-es-Salaam); Botswana–Zimbabwe link to South African network; Blue Train (Cape Town to Pretoria) (NCERT §Railways, p. 58).

- **Trans-Siberian Railway** runs St. Petersburg to Vladivostok via Moscow, Ufa, Novosibirsk, Irkutsk, Chita, Khabarovsk; **9,332 km** long — most important in Asia and longest double-tracked, electrified trans-continental railway in the world (NCERT §Trans-Siberian Railway, p. 58–59).
- **Trans-Canadian Railway**: 7,050 km, Halifax to Vancouver via Montreal, Ottawa, Winnipeg and Calgary; constructed in 1886; economic artery of Canada (NCERT §Trans-Canadian Railways, p. 59).
- **Union and Pacific Railway**: New York to San Francisco via Cleveland, Chicago, Omaha, Evans, Ogden, Sacramento; exports ores, grain, paper, chemicals, machinery (NCERT §The Union and Pacific Railway, p. 59).
- **Australian Trans-Continental Railway**: Perth to Sydney via Kalgoorlie, Broken Hill and Port Augusta; a north–south line connects Adelaide–Alice Spring–Darwin–Birdum (NCERT §Australian Trans-Continental Railway, p. 60).
- **Orient Express**: Paris to Istanbul via Strasbourg, Munich, Vienna, Budapest, Belgrade; London–Istanbul reduced to **96 hours** vs 10 days by sea. A proposed **Trans-Asiatic Railway** would link Istanbul to Bangkok via Iran, Pakistan, India, Bangladesh, Myanmar (NCERT §Orient Express, p. 60).
- Water transport needs no route construction; oceans are linked and negotiable; energy/friction cost is lower than land. Sea routes include the **Northern Atlantic** (also called the **Big Trunk Route**, busiest in the world, carries one-fourth of world's foreign trade); **Mediterranean–Indian Ocean** (via Suez, ports Port Said, Aden, Mumbai, Colombo, Singapore); **Cape of Good Hope**; **Southern Atlantic**; **North Pacific** (converges at Honolulu; Great Circle Vancouver–Yokohama 2,480 km halves distance); **South Pacific** (via Panama Canal; Panama–Sydney 12,000 km) (NCERT §Water Transport / Sea Routes, p. 60–63).
- **Suez Canal**: built 1869 in Egypt, links Mediterranean (Port Said) to Red Sea (Port Suez); **about 160 km, 11–15 m deep, sea-level with no locks**; ~100 ships cross daily, each takes 10–12 hours (NCERT §The Suez Canal, p. 63).
- **Panama Canal**: connects Atlantic (Colon) to Pacific (Panama City) across Panama Isthmus; **about 72 km long**, six-lock system raising/lowering ships 26 m; shortens New York–San Francisco by 13,000 km; vital to Latin American economies (NCERT §The Panama Canal, p. 63–64).
- **Inland waterways** depend on **navigability** (width and depth of channel), **water flow**, and **transport technology**. Major systems: **Rhine** (700 km navigable from Rotterdam to Basel; world's most heavily used, 20,000 ocean ships + 2,00,000 inland vessels per year); **Danube** (Black Forest to Taurna Severin; exports wheat, maize, timber, machinery); **Volga** (11,200 km navigable, drains into Caspian; Volga–Moscow and Volga–Don canals); **Great Lakes–St. Lawrence Seaway**; **Mississippi–Ohio** (up to Minneapolis) (NCERT §Inland Waterways, p. 64–66).

- **Air transport** is the fastest but most costly mode; ideal for high-value/perishable cargo and inaccessible terrain. **U.S.A. alone accounts for 60 per cent of the airways of the world**. The Northern Hemisphere has a distinct east–west belt of intercontinental air routes; Africa, Asiatic Russia and South America lack dense air services (NCERT §Air Transport / Inter-Continental Air Routes, p. 66).
- **Pipelines** are used for water, petroleum, natural gas (and LPG, liquidified coal, even milk in New Zealand). **Big Inch** carries petroleum from Gulf of Mexico to North-eastern U.S.A.; about **17 per cent of all freight per tonne-km is carried through pipelines in U.S.A.**; the proposed **Iran–India via Pakistan** oil/gas pipeline will be the world's longest (NCERT §Pipelines, p. 66–67).
- **Communication** evolved from telegraph and telephone to **satellite communication** (cost invariant with distance — same to communicate over 500 km as over 5,000 km via satellite); India's satellites include **Aryabhatt (19 April 1975), Bhaskar-I (1979), Rohini (1980), APLE/APPLE (19 June 1981, via Arian rocket)** (NCERT §Communications / Satellite Communication, p. 67–68).
- **Optic fibre cables (OFC)** allow large, secure, virtually error-free data transmission; digitisation in the 1990s merged telecom with computers to form the Internet. **Cyberspace** is the electronic digital world for accessing information over computer networks; Internet users grew from <50 million (1995) to ~5.4 billion (2023); U.S.A.'s share dropped from 66 per cent (1995) to 25 per cent (2005). Internet, fax, TV and radio make the **global village** a reality (NCERT §Cyber Space – Internet, p. 68).
- **Channel Tunnel — London to Paris:** Operated by Euro Tunnel Group through England, the Channel Tunnel under the English Channel connects London directly with Paris and runs Eurostar passenger services. NCERT cites it as an example of how passenger transport remains more important than freight on European railways (NCERT p. 57).
- **Comparison of canals (Suez vs Panama):** The Suez Canal (1869) is a sea-level canal without locks, about 160 km long and 11–15 m deep, linking Port Said (Mediterranean) to Port Suez (Red Sea); it shortens the London–Mumbai voyage by about 7,000 km. The Panama Canal (1914), only ~72 km long, uses a six-lock system to raise and lower ships by 26 m across the Panama Isthmus, connecting Colon (Atlantic) to Panama City (Pacific) and shortening New York–San Francisco by 13,000 km. Both are vital arteries — Suez for Europe–Asia trade and Panama for Latin American and US west-coast trade (NCERT pp. 63–64).
- **Big Trunk Route in detail:** The Northern Atlantic Sea Route, called the Big Trunk Route, links the highly industrialised north-eastern USA with north-western Europe. It carries about one-fourth of the world's foreign trade by volume — making it the busiest oceanic artery in the world. Other major sea routes covered are the Mediterranean–Indian Ocean route (via Suez), the Cape of Good Hope route, the Southern Atlantic, the North Pacific (converging at Honolulu; Great Circle Vancouver–Yokohama is 2,480 km — half the conventional distance) and the South Pacific (Panama–Sydney is 12,000 km) (NCERT pp. 61–63).

- **Indian satellite chronology:** Aryabhatt (19 April 1975), Bhaskar-I (1979), Rohini (1980) and APPLE — Arian Passenger Payload Experiment — (19 June 1981, launched aboard the European Arian rocket) mark India's progressive entry into satellite communication. These to illustrate the principle that satellite communication is cost-invariant with distance — transmission over 500 km costs the same as over 5,000 km (NCERT p. 68).
- **Pipeline transport — global examples:** Pipelines move water, petroleum, natural gas, LPG, slurried coal, sewage and — in New Zealand — even milk. The Big Inch pipeline carries petroleum from the Gulf of Mexico oil fields to north-eastern USA; the trans-Alaskan pipeline moves crude from Prudhoe Bay to Valdez; the proposed Iran–India via Pakistan oil/gas pipeline (IPI) would be the world's longest. In the USA about 17 per cent of all freight per tonne-km moves through pipelines (NCERT pp. 66–67).

2.2 Definitions to memorise

Term	Definition	Page
Transport network	Several places (nodes) joined by a series of routes (links) to form a pattern	54
Highway	Metalled road, 80 m wide, with separate lanes, bridges, flyovers and dual carriageways for unobstructed flow	56
Border road	Road laid along international boundary, integrating remote areas and serving defence	57
Road density	Length of road per unit area (e.g., 0.65 km per sq km in North America)	56
Standard gauge	Railway gauge of 1.44 m (used in U.K.)	57
Big Trunk Route	Northern Atlantic sea route — busiest in the world, carries 1/4 of world's foreign trade	62
Big Inch	Famous pipeline carrying petroleum from Gulf of Mexico oil wells to North-eastern U.S.A.	67
Navigability	Width and depth of channel determining suitability of a river for inland water transport	64
Cyberspace	World of electronic computerised space encompassed by Internet (including www)	68
Trans-continental railway	Railway running across a continent linking its two ends, built for economic and political reasons	58
Pan-American Highway	Continental highway under construction that will connect South, Central and North America	57
Trans-Canadian Highway	Highway from Vancouver to St. John's City	56

Term	Definition	Page
Alaskan Highway	Highway from Edmonton (Canada) to Anchorage (Alaska)	57
Stuart Highway	Australia's Trans-Continental Highway from Darwin to Melbourne via Tennant Creek and Alice Springs	57
Eurostar	High-speed passenger train running through the Channel Tunnel between London and Paris	57
Orient Express	Famous Paris–Istanbul rail service (London–Istanbul in 96 hours vs 10 days by sea)	60
Suez Canal	160-km sea-level canal (1869) linking Port Said (Mediterranean) with Port Suez (Red Sea)	63
Panama Canal	72-km canal (1914) with a six-lock system linking Colon (Atlantic) to Panama City (Pacific)	63–64
APPLE	Arian Passenger Payload Experiment — Indian satellite launched 19 June 1981 via Arian rocket	68

2.3 Diagrams / processes to remember

- **Fig. 7.1 Ropeway/Cable cars in Austria** — newer land transport for steep slopes/ mines (p. 55).
- **Fig. 7.2 Horse cart in Tefki, Ethiopia** — pack-animal transport (p. 55).
- **Fig. 7.3 Dharmavaram–Tuni National Highway, India** — illustrates highway (p. 56).
- **Fig. 7.4 Tube train in Vienna** — underground commuter rail (p. 57).
- **Fig. 7.5 Trans-Siberian Railway map** — St. Petersburg–Moscow–Kazan–Yekaterinburg–Tyumen–Omsk–Novosibirsk–Krasnoyarsk–Angarsk–Chita–Khabarovsk–Vladivostok (p. 59).
- **Fig. 7.6 Trans-Canadian Railway map** — Halifax–Quebec–Montreal–Ottawa–Winnipeg–Regina–Calgary–Kamloops–Vancouver (p. 60).
- **Fig. 7.7 Australian Trans-Continental Railway map** — Perth–Kalgoorlie–Port Augusta–Broken Hill–Sydney; Adelaide–Alice Spring extension (p. 61).
- **Fig. 7.9 Major Sea Routes & Sea Ports** — global sea route map (p. 62).
- **Fig. 7.10 Suez Canal map** — Port Said to Suez via Ismailia (p. 63).
- **Fig. 7.11 Panama Canal map** — Colon (Atlantic) to Panama City (Pacific) via Gatun, Pedro Miguel and Miraflores locks (p. 64).
- **Fig. 7.14 Rhine Waterway map** — Rotterdam to Basel via Cologne, Mainz, Mannheim, Strasbourg (p. 65).
- **Fig. 7.16 Major Airports map** — global air nodal points (p. 67).

2.5 Key data table (NCERT figures to memorise)

#	Quantity / pairing	Value	NCERT page
1	World's total motorable road length	~15 million km	56
2	North America's share of world roads	33%	56
3	North American highway density	0.65 km per sq km	56
4	World's total rail length	~13 lakh km	57
5	European rail length	~4,40,000 km	57
6	Country with highest rail density	Belgium (1 km per 6.5 sq km)	58
7	Share of Russian transport carried by rail	90%	58
8	North America's share of world rail network	~40%	58
9	Length of Trans-Siberian Railway	9,332 km	58
10	Length of Trans-Canadian Railway	7,050 km	59
11	Suez Canal length / depth	160 km / 11–15 m	63
12	Panama Canal length / lock lift	~72 km / 26 m	63–64
13	Rhine — navigable length & annual ocean ships	700 km / 20,000	64–65
14	USA's share of world airways	60%	66
15	Share of US freight carried by pipelines	~17% per tonne-km	67

2.4 Common confusions / NTA trap points

- **Trans-Continental Stuart Highway** is in Australia — Darwin (north coast) to Melbourne via Tennant Creek and Alice Springs — NOT Edmonton–Anchorage (that is the **Alaskan Highway**) and NOT Vancouver–St. John's (that is the **Trans-Canadian Highway**) (p. 56–57).
- **Belgium**, not Russia or USA, has the world's **highest density of railways** (1 km per 6.5 sq km). North America has the largest rail **network** (40 per cent of world total) — density ≠ network length (p. 57–58).
- **Big Trunk Route = Northern Atlantic Sea Route**, not North Pacific. North Pacific converges at Honolulu (p. 61–63).
- **Suez Canal** has **no locks** (sea-level), built 1869, ~160 km. **Panama Canal** has a **six-lock system**, ~72 km — students often swap their lengths and lock features (p. 63–64).
- **Big Inch** pipeline carries **petroleum** (NOT milk or LPG; milk-through-pipeline is the New Zealand example) (p. 66–67).

- **Channel Tunnel** connects **London–Paris** (operated by Euro Tunnel Group through England) — not London–Berlin or Paris–Berlin (p. 57).
- **APPLE (Arian Passenger Payload Experiment)** was launched on **19 June 1981** through the Arian rocket; Aryabhatt was India's first satellite (19 April 1975) — easy to mix up satellite names and years (p. 68).
- **Cape Route vs Mediterranean–Indian route:** The Cape of Good Hope route around southern Africa was the main Europe–Asia link before the Suez Canal opened in 1869. After 1869 most traffic shifted to the shorter Mediterranean–Indian route. Very large crude carriers (VLCCs) that cannot transit Suez still use the Cape route, which NCERT highlights as a long but free of canal-toll alternative.
- **Trans-Siberian Railway sequence:** Memorise terminal pairing (St. Petersburg–Vladivostok) and the principal en-route cities — Moscow, Ufa, Novosibirsk, Irkutsk, Chita, Khabarovsk. The line is the world's longest double-tracked, electrified trans-continental railway at 9,332 km.
- **Roads vs Railways — country contrasts:** USA leads in road network and airways; Belgium leads in rail density; Russia depends on rail for 90 per cent of its transport; North America accounts for 40 per cent of world rail network length. Mixing density with network length is a common NTA trap.
- **Inland vs ocean shipping:** Inland waterways need navigability — width and depth of channel, water flow, and transport technology — to be useful. The Rhine is the world's most heavily used inland waterway with 20,000 ocean-going ships and 2,00,000 inland vessels annually; the Volga is the longest navigable river (11,200 km) in the section covered by NCERT.

🎯 Practice MCQs

📊 PYQ Alignment

This chapter is a high-yield, fact-dense unit on the tertiary sector and reliably contributes 6–9 MCQs each year in CUET (UG) Geography. Typical questions probe end-points of major highways/railways (Stuart, Trans-Canadian, Trans-Siberian, Orient Express), canal facts (Suez vs Panama lengths/locks/year), Big Trunk Route identification, pipeline names (Big Inch), satellite chronology (Aryabhatt, Bhaskar, APPLE), and statistical anchors (15 million km roads, 13 lakh km railways, U.S.A. = 60 per cent of airways, North America = 40 per cent of world rail network). For the full CUET PYQ archive on transport and communication, see `/pyq/geography`.

CUET 2025 — Actual PYQs from this chapter

Q.11 (CUET 2025) Match List-I with List-II: List-I (Pack Animals) — List-II (Areas): (A) Mules — (i) Mountains; (B) Camels — (ii) Siberia; (C) Reindeer — (iii) Deserts; (D) Horses — (iv) Western Countries.

- A) A-i, B-iii, C-ii, D-iv B) A-iii, B-ii, C-iv, D-i C) A-i, B-ii, C-iii, D-iv D) A-iv, B-iii, C-i, D-ii Tests: Pack animals and their regional use Answer: Not in extracted key

Q.13 (CUET 2025) The Channel Tunnel connects which of the following pair of cities?

- A) London – Moscow B) London – Paris C) London – Brussels D) Berlin – London Tests: Channel Tunnel (London – Paris) as a major underwater rail link Answer: Not in extracted key

Q.15 (CUET 2025) The Big Inch Pipeline, famous for transporting petroleum from oil wells, is located in:

- A) USA B) Canada C) Brazil D) India Tests: Big Inch Pipeline — USA Answer: Not in extracted key

Q.18 (CUET 2025) Identify the correct statements about pipelines: (A) Pipelines are extensively used to transport liquid and gas. (B) Pipelines can also transport liquid coal. (C) Milk is transported through pipelines in some countries. (D) LPG is supplied through gas cylinders only.

- A) (A), (C) and (D) only B) (A), (B) and (C) only C) (A) and (C) only D) (A), (C) and (D) only Tests: Uses of pipelines for liquids, gas, slurry coal, milk Answer: Not in extracted key

Q.19 (CUET 2025) Arrange the following railway stations of the Trans-Siberian Railway from west to east: (A) Moscow (B) Kazan (C) Omsk (D) Chita

- A) (A), (B), (C), (D) B) (A), (C), (B), (D) C) (B), (C), (D), (A) D) (C), (B), (D), (A) Tests: Trans-Siberian Railway — stations west to east Answer: Not in extracted key

CUET 2024 — Actual PYQs from this chapter

Q.13 (CUET 2024) Match railway stations with trans-continental railways. List-I — List-II: (A) Chita — (I) Australian Trans-Continental Railway; (B) Winnipeg — (II) Union Pacific Railway; (C) Broken Hill — (III) Trans-Siberian Railway; (D) Chicago — (IV) Trans-Canadian Railway.

- A) A-I, B-II, C-III, D-IV B) A-III, B-IV, C-I, D-II C) A-II, B-I, C-IV, D-III D) A-III, B-II, C-IV, D-I Tests: Major trans-continental railways and their stations Answer: Not in extracted key

Q.18 (CUET 2024) Which statement about Rhine waterways is NOT correct?

- A) Navigable for 700 km B) Passes through coalfields C) Ocean vessels reach Cologne D) Connects Switzerland, France and Russia Tests: Rhine waterway — facts on length, coalfields, navigability Answer: Not in extracted key

Q.41 (CUET 2024) In which country is milk transported from farms to factories through pipelines?

- A) India B) New Zealand C) Canada D) Mexico **Tests:** Milk pipelines — New Zealand example **Answer:** Not in extracted key