

forms, their internal structures and fields of stability.
 Facies, facies association and facies models- fluvial, deltaic and beach-barrier bar systems.
 Sandstone, conglomerate and limestone: definition, composition, classification.

V. Environmental Geology:

Natural hazards – earthquake, tsunami, volcanic eruption, landslides, floods, and droughts.
 Impact of human activities on wetlands and forests, use of fertilizers on land.
 Pollution of groundwater, surface water and ocean.
 Composition of air, air pollution, effects of air pollution on human health.
 Impact of mining on atmosphere, biosphere, lithosphere and hydrosphere. Industrial and radioactive waste disposal.
 Environmental Protection, legislative measures, processes of mitigation.

VI. Economic Geology:

Classification of ore deposits, protore, ore, gangue, tenor and grade.
 Ore forming processes: magmatic, sedimentary, metamorphic, hydrothermal and supergene.
 Controls of ore localization, ore textures and structures.
 Metallogenic provinces and epochs.
 Geology of important metallic deposits of India: chromite, copper, iron, lead-zinc, manganese and uranium-thorium.
 Geology of important non-metallic deposits of India: bauxite, mica, phosphates, barite, diamond and graphite. Rock as construction material.
 Raw materials used in iron and steel, cement, refractories, fertilizer industries.
 Coal: its origin, chemical, macroscopic and microscopic constituents, ranks, classification, grade and utilization. Distribution of coal in India.
 Petroleum and natural gas deposits with special reference to their origin, migration and accumulation. Distribution of petroleum and natural gas in India.
 Methods of mineral prospecting (geological, geophysical and geochemical), mineral beneficiation and ore dressing.

HISTORY :

Paper- I :

ANCIENT AND MEDIEVAL INDIA

UNIT A

1. Sources :

Archaeological Sources: Exploration, Excavation, Epigraphy, Numismatics, Monuments.

Literary Sources: Indigenous, Biography, Religious Literature, Creative Literature, Scientific Literature, Literature in Regional Languages.

Foreign Accounts: Greek, Roman, Chinese and Arab Writers.

2. The Harappan Civilization : Third to Second Millenium B.C.E

Origin, Date, Extent, Characteristics, Decline, Survival and Significance, Art and Architecture.

3. The Iron Age in India, Vedic Society and the Megalithic Culture: 1500 B.C.E to 6th Century B.C.E.

Distribution of pastoral and farming cultures outside the Harappan orbit. Early Vedic Society, Polity and Economy. Changes in the later Vedic period.

4. Period of Mahajanapadas :

Formation of territorial States (Mahajanapada): Republics and Monarchies; Spread of Jainism and Buddhism; Rise of Magadha and the Nandas. Iranian and Macedonian invasions and their impact.

5. The Mauryan Empire:

Foundation of the Mauryan Empire, Chandragupta, Kautilya and Arthashastra; Asoka; Concept of Dharma; Edicts; Polity, Administration; Economy; Art, Architecture and Sculpture; External contacts; Religion; Spread of religion; Literature. Disintegration of the Empire.

6. Post-Mauryan Period

Northern India: The Sungas and the Kanvas, The Indo-Greeks, Sakas, Kushanas, Western Kshatrapas, Contact with the outside world; The Deccan and Southern India: The Satavahanas, Tamil States of the Sangam Age: Administration, Economy: land grants, trade guilds and urban centres; Social conditions. Culture and Religion: Rise of Mahayana Buddhism and Buddhist Centres; Literature and culture; Art and architecture and science.

	<p>7. Guptas, Vakatakas and Vardhanas:</p> <p>Samundra Gupta, Chandragupta-II: Gupta Polity and administration, Economic conditions, land grants, Caste system, Position of women, Education and educational institutions; Nalanda, Vikramsila and Valabhi, Creative Literature, scientific literature, art and architecture.</p> <p>Decline of the Gupta Empire; changes in Trade network, Decline of urban centres, Indian Feudalism.</p> <p>8. The Post Gupta Period and the Rise of Regional States</p> <p>The Kadambas, Pallavas, Chalukyas, Palas, Senas, Rashtrakutas, Paramaras, Cholas, Hoysalas, Pandyas.</p> <p>Regional Polities and Administration, Local Government, Land administration, Economy, Trade Guilds.</p> <p>Religion: Proliferation of Religious Sects in Buddhism, Vaishnava and Saiva religions. Tamil Bhakti Movement, Shankaracharya; Vedanta.</p> <p>Cultural Aspects, Regional Languages and texts, Literature, Growth of art and architecture, Sculpture, Temple Architecture; Education and Literature, major philosophical thinkers and schools, ideas in Science and Mathematics.</p> <p>Arab conquest of Sind; Alberuni.</p> <p style="text-align: center;"><u>UNIT B</u></p> <p>1. Major political developments in India during 13th to 15th Centuries:</p> <p>Campaigns of Mahmud Ghazni, Muhammad of Ghor – The foundation of the Delhi Sultanate and the early Turkish Sultans – Qutbuddin Aibak to Balban – The Khalji revolution – Alauddin Khalji, conquests and economic reforms – , Muhammad-bin-Tughlaq and his projects – Firuz Tughlaq – agrarian measures, public works- Decline of the Tughlaqs.</p> <p>Provincial Kingdoms – Bengal under the Iliyas Shahi and Hussain Shahi Dynasties—Bahmani and Vijaynagar Empires – Kashmir and Gujarat.</p> <p>2. Society, Culture and Economy during 13th and 15th centuries:</p> <p>Social and Cultural Assimilation – Sufi and Bhakti Movements—Kabir, Nanak, Chaitanya, Namdeva, Growth of Regional Languages and Literature – Nature of the State – agriculture, revenue system (iqta) trade and Commerce – art and architecture.</p> <p>3. Major Political Developments in India during 16th and 18th Centuries:</p> <p>Coming of the Mughals – Babur and the foundation of the Mughal Empire, – Afghan – Mughal Contest for supremacy—Humayun and Sher Shah – Consolidation of the Mughal Empire— Akbar, Jahangir and Nur Jahan, Shah Jahan and Aurangzeb – The Mughal Central State and regional powers— Rajputs, Afghans, Marathas, Sikhs, Deccan, Awadh and others. Peasants in Revolt – Jat, Satnami etc. Later Mughals – Fall and Disintegration of the Empire – Rise of the Regional States – Bengal, Hyderabad, Awadh and the Marathas.</p> <p>4. Society, Culture and Economy during 16th and 18th centuries:</p> <p>Administrative System- Sher Shah to Akbar, Jagir and Mansabdari systems, – Evolution of religion under the Mughals – Sulh-i-Kul and Din-i-Ilahi – Mughal art, architecture, painting, music and literature, Mughal economy and Society—Condition of the peasants – urbanisation –trade and commerce and the mercantile classes – Coming of the European merchants and 'trade revolution'.</p>
Paper – II :	<p style="text-align: center;"><u>MODERN INDIA AND THE WORLD</u></p> <p style="text-align: center;"><u>UNIT A</u></p> <p>1. European Penetration and Rise of British power in India:</p> <ul style="list-style-type: none"> • The early European Settlements in India in the 17th and 18th centuries - The Anglo - French rivalry. • The British East India Company and the Bengal Nawabs - the EIC as sovereign ruler of Bengal (From Plassey to Buxar), Grant of Dewani. • British relations with and subjugation of the other principal Indian powers - Oudh, Hyderabad, Marathas, the Sikhs, and Mysore.

2. Indian economy under the British Colonial Rule:-

(A) Impact of Colonial rule on Indian agrarian economy:-

- Land revenue settlements– Permanent, Ryotwari and Mahalwari Settlements.
- Economic Impact of revenue settlements – Commercialization and its consequences.
- Rural Indebtedness and growth of landless labour.
- Famine and poverty.

(B) Changing nature of India's trade and industry under the colonial rule:-

- Dislocation of traditional trade and commerce
- De-industrialization - decline of village industries and town handicrafts
- Railways
- Growth of Foreign capital and rise of modern industries.

3. Indian Society in transition: Cultural Encounter and Socio-cultural changes:

- Introduction of western education and modern ideas
- Reform movements - Ram Mohan Roy, Brahma Samaj, Young Bengal, Vidyasagar, Arya Samaj, Vivekananda and Ramkrishna Mission.
- Women's Question and Indian Reformers
- The Growth of modern vernacular literature, press and public opinion, growth and spread of scientific ideas.
- The Faraizi and Wahabi movements; The Aligarh movement, Deoband School.
- Social Reform movements in the late 19th and early 20th centuries (including depressed caste movements) - a broad overview.

4. Resistance to the British rule:

- Early uprisings against the British rule in 18th and 19th centuries (1757 - 1856) with special reference to Bengal and eastern India.
- The Revolt of 1857 - genesis, course, character, causes of its failure and its impact.
- The Act of 1858 and the establishment of the British Raj.

5. Growth of Nationalism (1858 - 1918):

Factors leading to birth of Indian Nationalism - Early Political Associations - The foundation of the Indian National Congress (1885) - The Safety-valve thesis - Programme and objectives of the early Congress - Economic Nationalism and Drain Theory - The moderates and the extremists - the Partition of Bengal (1905) - The Swadeshi Movement in Bengal and other provinces - the economic, cultural and political aspects of Swadeshi movement.

6. Gandhian Era (1919 - 1947):

Rise of Gandhi - Character of Gandhian nationalism - the Rowlatt Satyagraha - The Khilafat - the Non Co-operation movement - Simon Commission, Nehru Report and Round Table Conferences - Civil Disobedience Movement - Quit India Movement.

The Left: The Left within the Congress and Jawaharlal Nehru - Subhas Chandra Bose and the INA - the Congress Socialist Party - the Communist Party of India - other left parties.

The Peasant Movement.

The Working Class and Trade Union Movements.

Women's organisations, development of women issues and the role of women in nationalist movement.

The Peoples' Movement in Princely States.

The Post - War upsurge

Growth of Muslim Separatism - Rise of Muslim League - Demand for Pakistan

Hindu Nationalism

Depressed Classes and caste politics with special reference to the role of B. R. Ambedkar.

Communalism, British Policy, Partition and Independence.

7. The Constitutional Developments (1773 - 1947):

The Regulating Act, Pitt’s India Act and the Charter Acts.

The Acts of 1861 and 1892 - the Morley Minto Reforms (1909) - the Montague-Chelmsford Reforms (1919) - Government of India Act (1935) - Working of Provincial Ministries - Cripps Mission, Wavell Plan and Cabinet Mission - Act of Indian Independence (1947).

8. Consolidation as a Nation after 1947:

Framing of the Indian Constitution - Integration of Princely States - the question of National Language - the linguistic reorganisation of States, making of India’s foreign policy - Non-alignment and the Third World - India and her neighbours.

UNIT B

01. Enlightenment and Modern Ideas:

- (i) Major ideas of enlightenment ; and its impact
- (ii) French Revolution and its aftermath: 1789 - 1815
- (iii) The American War of Independence (1776). The American civil War

02. Industrialization:

- (i) Industrial Revolution in England: causes, nature, impact.
- (ii) Industrialization in other countries: USA, Germany, Russia, Japan.

03. Nationalism:

- (i) Rise of nation states in Europe: Italy & Germany.

04. Imperialism, Colonialism and War:

- (i) Capitalism, imperialism, scramble for colonies.
- (ii) Origins and impact of the First World War
- (iii) Making of the Russian Revolution & establishment of a Socialist State.

05. World history from 1919 to 1945:

- (i) League of Nations, collective security.
- (ii) Rise of Nazism and Fascism : Germany, Italy & Japan.
- (iii) Second World War: Causes and consequences.

06. Asia and Africa after World War II:

- (i) Chinese Revolution of 1949
- (ii) Nationalist movements and decolonization in South and South East Asia.
- (iii) Changes in Africa: Egypt and South Africa, End of Apartheid.

07. Cold War & Global scenario:

- (i) Origins and Growth of cold War
- (ii) UNO and global disputes - Korea, Congo, Cuban crisis.
- (iii) Emergence of Third World and NAM

08. Collapse of Soviet Union

- (i) Disintegration of the Soviet Union: Causes & Consequences
- (ii) End of the Cold War
- (iii) Political Changes in Eastern Europe.

LAW :

Paper – I : Constitutional Law of India :International Law : Jurisprudence.

Paper – II : Law of Crimes and Torts : Law of Contracts and Mercantile Law : Indian Evidence Act.

MATHEMATICS :

Paper – I :

Paper-I

(1) Linear Algebra:

Vector spaces over R and C, linear dependence and independence, subspaces, bases, dimension; existence of basis for finite dimensional vector spaces; deletion and replacement theorem. Linear transformations, rank and nullity, matrix of a linear transformation.

Algebra of Matrices; Row and column reduction, Echelon form, congruence’s and similarity; Rank of a matrix; Inverse of a matrix; Solution of system of linear equations; Eigenvalues and eigenvectors, characteristic polynomial, Cayley-Hamilton theorem.

Euclidean space, Gram-Schmidt orthogonalization. Symmetric, skew-symmetric, Hermitian, skew-Hermitian, orthogonal and unitary matrices and their eigenvalues. Quadratic forms, diagonalization of symmetric matrices.