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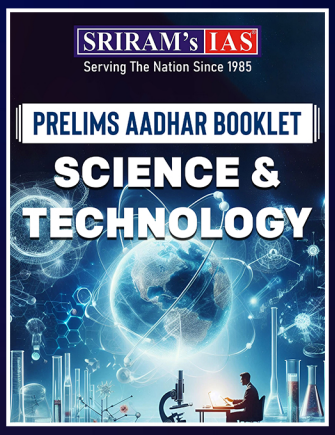

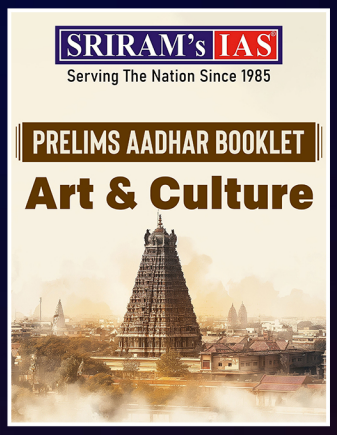

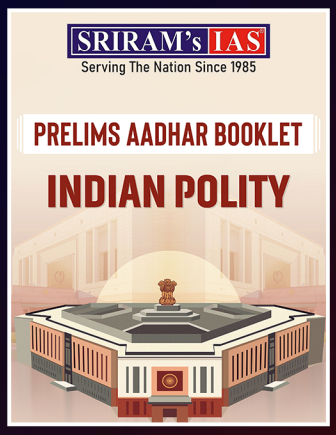

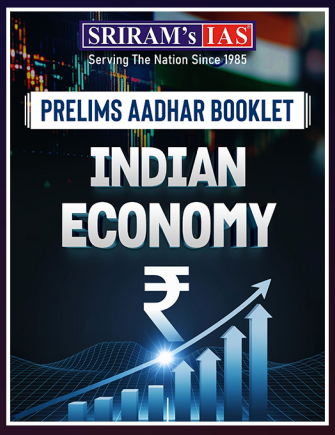

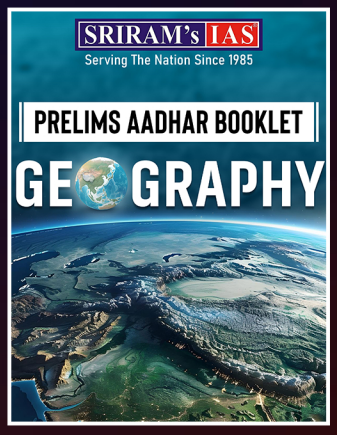

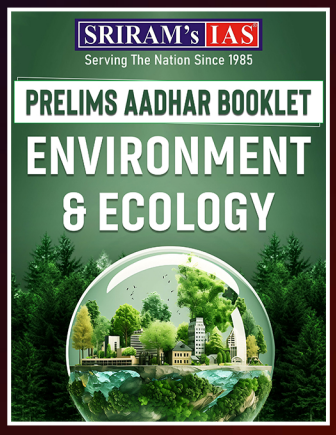

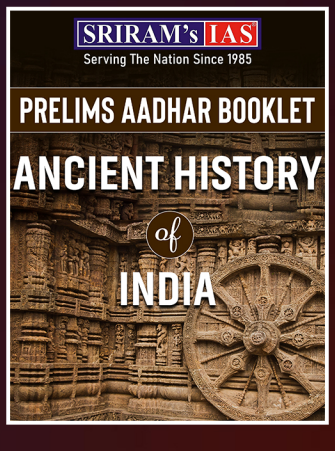

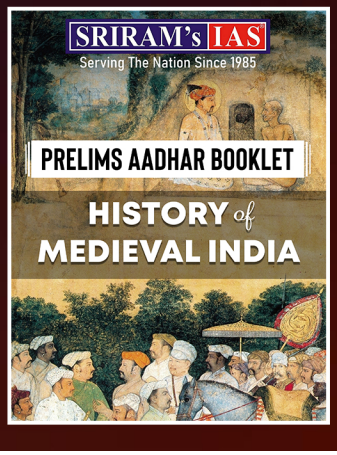

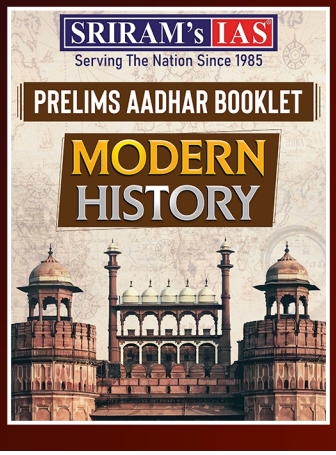

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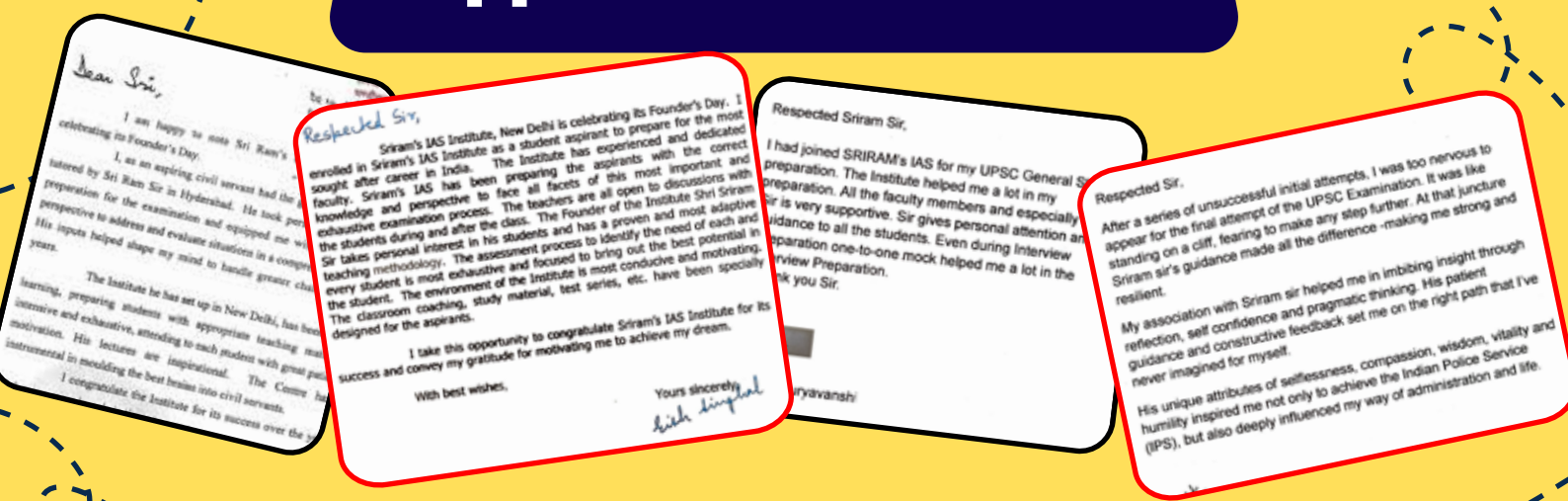

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Sample Contents

1. Fundamental Rights (Part III) 2
(Indian Polity)

2. India in 18th Century 11
(Modern History)

3. India-Location 19
(Geography)

4. Atmosphere 20
(Geography)

5. Biotechnology 23
(Science & Technology)

6. Ecosystem 33
(Envrionment & Ecology)

7. The Gupta Period 38
(Ancient History of India)

8. National Income Accounting (NIA) 46
(Indian Economy)

9. Delhi Sultanate 50
(History of Medieval India)

Fundamental Rights (Part III)

<table>
<tr><td>Meaning</td><td colspan="3">Set of entitlements guaranteed and protected by the Constitution</td></tr>
<tr><td>Why Fundamental</td><td colspan="3">• Essential for the development of an individual in all aspects and preserve their dignity.
• Guaranteed and protected by the supreme law of the country, i.e. the Constitution of India.</td></tr>
<tr><td>Sources</td><td colspan="3">Inspired by the Bill of Rights in the United States Constitution.</td></tr>
<tr><td>Characteristics</td><td colspan="3">• Justiciable (can approach the court directly for its enforcement).
• Limits arbitrary actions of executive and legislature.
• Available against the actions of private individual also besides arbitrary State actions.
• Supreme Court is the guarantor and defender.
• Some are only available to citizens (Article 15, 16, 19 29, 30), all others are available to both citizens and foreigners.
• Can be curtailed or even repealed (subject to Basic Structure Doctrine) by an amendment
• Reasonable restrictions limit them from being absolute.
• All except Article 20 and 21 can be suspended during a National Emergency.
• Some are negative in character as they restrict the authority of the State.
• Some others are positive as they confer certain privileges on the persons.
• Can be restricted for armed forces, paramilitary forces, police forces, intelligence agencies.
• Application restricted during Martial law under Article 34
• Most are self- executory, other requires a law to be enacted by Parliament</td></tr>
<tr><td colspan="4">Classification</td></tr>
<tr><td rowspan="3">State and laws</td><td>Article 12
Defines “State” to include</td><td colspan="2">• Legislative and executive organs of both the Union and State government.
• Local authorities like Municipalities, Panchayats (defined in General Clauses Act, 1897).
• Other (even private) authorities which are agency/instrumentality of government.
R D Shetty Vs Airport Authority, 1979 defined the agencies
• as bodies financed and controlled by government:
• does work of public importance:
• any govt. dept transferred to corporation
• monopoly conferred by the government.</td></tr>
<tr><td>Article 13
Defines “Laws”</td><td colspan="2">Laws” that can be challenged for contravention with Fundamental Rights to include:
• Pre-constitutional laws (laws in force).
• Laws enacted by Parliament or State Legislatures.
• Executive an d delegated legislation, viz. orders, bye-laws, rules, regulations, notifications.
• Customs having the force of law or non-legislative law.
This Article does not apply to amendments made under Article 368.</td></tr>
<tr><td>Doctrine of Eclipse</td><td>• All the Pre-Constitutional laws which are against the fundamental rights of the Indian Constitution will become dormant and not dead.
• They will remain dormant as long as the state does not amend the law and its infringing nature.
This doctrine applies to only Article 13(1) of the Indian Constitution.</td></tr>
</table>

<table>
<tr><td rowspan="2">State and laws</td><td rowspan="2">Article 13
Defines "Laws"</td><td>Doctrine of Waiver</td><td>A Person who is receiving a right or a privilege can waive that right according to his will.</td></tr>
<tr><td>Doctrine of Severability</td><td>• A part of a law that is against the provisions of the constitution then only that offending part will be declared as void and not the whole statute.
• This doctrine is applied in both Article 13 (1) and Article 13 (2) of the Indian Constitution.</td></tr>
<tr><td rowspan="4">Right to equality</td><td rowspan="3">Article 14
Enjoins upon the State to establish (not to deny)- Equality Before Law & Equal Protection</td><td colspan="2">Equality before law (British concept) which means:
• absence of special privileges in favour of individuals
• equal subjection of all individuals to the ordinary law.
• no individual, irrespective of one's material, social or official position, is above law.
It guarantees similar treatment in similar situation and not identical treatment.</td></tr>
<tr><td colspan="2">Equal protection of law (US concept) which means:
• Equality of treatment in equal circumstances-both in privileges conferred and, in liabilities, imposed by laws.
• Like should be treated alike and unlike should not be treated alike.
Prohibits class legislation but permits reasonable classification of persons and objects.
It does not require that the legislative classificatin should be scientifically and ligically perfect.</td></tr>
<tr><td colspan="2">Exceptions:
• Article 361 of the Constitution provides certain immunities to the President and the Governors of the State during their term of office-
➢ They both cannot be questioned by any Court for the exercise and performance of the powers and duties of their office
➢ No criminal proceedings shall be instituted or continued against them in any court
➢ No court can issue any process for their arrest or imprisonment.
➢ No civil proceedings can be instituted against them in any court in respect of any act done by them in their personal capacity, either before or after entering upon their office, without giving a two-month notice.
• Publication of substantially true report of proceedings of either house of Parliament or State legislature in a newspaper will not be liable to any civil or criminal proceedings (Article 361A)
• Parliamentary and Legislative privileges under Articles 105 and 194.
• Special provisions for implementing Directive Principles (Article 31-C).
• Immunity for foreign diplomats, sovereigns, and the UNO.</td></tr>
<tr><td>Article 15
Prohibits State from discriminating on grounds of religion, race, caste, sex or place of birth</td><td colspan="2">• Any act of the State-political, civil or otherwise, shall not discriminate between citizens on grounds only of religion, race, caste, sex or place of birth or any of them. (which means discrimination on other grounds are allowed)
• No discrimination as to the use of or access to the public places.
• Special provisions can be made for Women and Children
• Special provisions can be made for socially and educationally backward classes, and for theScheduled Caste (SCs) and the Scheduled Tribes (STs).
➢ This is only enabling provision and it is for the respective States either to enact a legislation or issue and executive instruction providing reservation.
➢ It is discretionary power and no writ can be issued to effect reservation.
➢ The provisions can be made both by the legislature and excutive.</td></tr>
</table>

Right to equality	***Article 15*** *Prohibits State from discriminating on grounds of religion, race, caste, sex or place of birth*	• Special provisions can be made for Socially educationally backward classes, and (STs) and (SCs) in matters of admission in both public and private educational institutes, whether aided or unaided but not minority institutions. (Article 30(1). (*this provision relating to admission to educational institutions was added by the 93rd Constitution Amendment Act, 2005*) • Special provision for the advancement of any economically weaker sections of citizens. ➢ *A maximum of 10 percent reservation in addition to the already existing reservations in educational institutions*. ➢ *The State to notify the criteria for the economically weaker sections from time to time.*
	Article 16 *Requires State to ensure equality of opportunity in matters of public employment*	• Equal opportunity to citizens in employment or appointment to any office under the State. • No discrimination on grounds of religion, race, caste, sex or place of birth, descent and residence only. • **Parliament has power** ➢ To declare residence as a criterion for employment. ➢ To make law for the reservation of backward class of citizens in appointment and post. • Reservation in matters of promotion can be made for Scheduled Castes and the Scheduled Tribes subject to "efficiancy in matters of administration" as ,mentioned in Article 335. • Religious or denominational institution shall appoint members of their community in official posts. • State can make any provision for the reservation of appointments or posts in favour of any economically weaker sections of citizens.
	Article 17 *Abolishes untouchability*	• Forbids and penalises practice of untouchability in any form. • Requires Parliament to prescribe punishment for practise of "Untouchability". *The Parliament enacted the Untouchability (Offences) Act, 1955, which was amended and renamed as the Protection of Civil Rights Act, 1955 in 1978.* ➢ The Act prescribes penal provisions for practise of "Untouchability" and defines civil rights as any right accruing to a person by reason of the abolition of Untouchability by Article 17 of the Constitution. ➢ However, neither the Constitution nor the Act defines the word "Untouchability".
		• Offences as per in the Protection of Civil Rights Act, 1978: ➢ Refusal to admit any persons to institutions established for public benefit such as hospitals and schools. ➢ Prevention of any person from worshipping or offering prayers at place of public worship ➢ Denial of access to any person to any shop, hotels or places of public entertainment. ➢ Preaching untouchability directly or indirectly. ➢ Justifying Untouchability on historical, philosophical, religious or traditional grounds. ➢ Insulting a member of Scheduled Caste on the ground of untouchability

<table>
<tr><td rowspan="5">Right to equality</td><td>Article 18
Abolishes all hereditary titles and prohibits conferring any title at all</td><td colspan="2">• Allows only military or academic titles on either its citizens or foreigners.
• Prohibits Indian citizens from accepting any titles from any foreign state.
• Prohibits foreigners holding any public office of profit or trust from accepting any title from any foreign State without the consent of the President of India.
• Also prohibits citizens or foreigners holding any public office of profit or trust from accepting any present, emolument or office from or under foreign State without the consent of President of India.
Note: In Balaji Raghavan case (1996) Supreme Court held that
➢ National Awards (Bharat Ratan and Padma awards) do not amount to “titles” within the meaning of Article 18
➢ National Awards should not be used suffix and prefix.
➢ Article 18 only abolishes hereditary titles of nobility
➢ Recognition of merit through awards is not a violation of principle of equality
➢ If used as appendages to the names of the awardees they should be forfeited</td></tr>
<tr><td rowspan="4">Article 19
Protects six Freedoms</td><td>Freedom of speech and expression</td><td>Citizens can express their views, opinions, beliefs and convictions freely by word of mouth, writing, printing, picturing or in any other manner.
It can be done subject to
• Sovereignty and integrity of India (added by 16th Constitution Amendment Act, 1963)
• Security of the State
• Friendly relation with Foreign States
• Public order
• Decency or morality
• Contempt of court
• Defamation
• Incitement to an offence
(all the above restrictions added by 1st CAA, 1951)</td></tr>
<tr><td>Freedom of assemble peacefully without arms</td><td>Citizens can peacefully hold public meetings, demonstrations, take out processions on public land but cannot strike.
It is subject to
• Sovereignty and integrity of India
• Public order including maintenance of traffic in the area concerned</td></tr>
<tr><td>Right to form unions or associations or co-operative societies</td><td>Citizens can form (not form) or join (not join) any associations or unions or co-operative (included by 97th Constitution Amendment Act, 2011) societies subject to Sovereignty and integrity of India, public order and morality.
• Does not cover the right to obtain recognition of the association or unions thus formed.</td></tr>
<tr><td>Right to move freely throughout territory of India</td><td>Citizens can move freely throughout the territory of the country subject to:
Restrictions in the interests of general public and for protection of interests of any Scheduled Tribe.</td></tr>
</table>

<table>
<tr><td rowspan="7">Right to Equality</td><td rowspan="2">Article 19
Protects six Freedoms</td><td>Right to reside and settle in any part of India</td><td>Citizens can temporarily stay and/or have permanent settlement in any part of the country subject to restrictions in the interests of general public and for protection of interests of any Scheduled Tribe.</td></tr>
<tr><td>Right to practice any Profession, occupation, trade or business</td><td>Citizens can practise any profession or to carry on any occupation, trade or business subject to public interest.
Citizens cannot carry on a profession or business that is immoral (trafficking of women or children) or dangerous (harmful drugs or explosives, etc.)
State can
• Prescribe necessary qualifications (professional or technical) for practising any profession or occupation, trade or business.
• Carry on any trade, business, industry or service by itself.</td></tr>
<tr><td rowspan="3">Article 20
Protection from</td><td>Retrospective Legislation</td><td>• Prohibits convictions for any act committed before criminalisation of that act.
• Prohibits greater penalty than that prescribed by law at time of commission of criminal act.</td></tr>
<tr><td>Double Conviction</td><td>• Prohibits judicial prosecution of a person twice for the same act.
• It only includes judicial proceeding and not departmental or administrative proceeding</td></tr>
<tr><td>Self-Incrimination</td><td>Protects an accused of criminal act from giving any documentary or oral evidence against oneself</td></tr>
<tr><td rowspan="2">Article 21
Protects life and personal liberty of a individual from arbitrary executive and legislature actions</td><td colspan="2">AK Gopalan Case (1950):
• Used “procedure established by law” to protect Personal liberty only from arbitrary executive action.
• A law cannot be questioned on the grounds of being unreasonable, unfair or unjust.</td></tr>
<tr><td colspan="2">Menaka Gandhi Case (1978):
• Used “due process of law” to rule that laws can be questioned on for being unreasonable, unfair or unjust
• Right to life and Personal liberty can only be taken by a law that is reasonable, fair and just.
• Right to life does not merely mean animal existence or survival but it includes Right to live with human dignity and all those aspects of life which make a person’s life meaningful, complete and worth living</td></tr>
<tr><td>Article 21A
Requires State to provide free and compulsory education to all children of age 6 to14 years.</td><td colspan="2">• It makes elementary education a Fundamental Right under the Constitution of India.(Added by the 86th Constitution Amendment Act 2002.)
• It should not be restricted to free and compulsory education but should also have high quality education without disctimination on the ground of child’s economic, social and cultural background.
• Parliament enacted the Right to Education Act, 2009 to implement the provision.</td></tr>
</table>

<table>
<tr><td rowspan="2">Right to Equality</td><td rowspan="2">Article 22
Requires State to protect individuals from</td><td>Arbitrary Punitive Arrest</td><td>Individuals should be
• informed of the grounds of arrest.
• allowed to consult and be defended by a legal practitioner of their choice.
• produced before a magistrate within 24 hrs
• released if the magistrate does not authorise further detention.</td></tr>
<tr><td>Arbitrary Preventive Detention</td><td>• Any individual cannot be detained for more than three months unless an advisory board, consisting of judges of High Court, reports sufficient cause for extending detention.
• Detained individual should be informed of the grounds of detention, excluding facts against the public interest.
• Detained individual should be afforded an opportunity to make a representation against the detention order
• Parliament can prescribe
➢ Circumstances and the types of cases in which a person can be detained for more than three months
➢ Maximum period for which a person can detained by any classes of cases
➢ Procedure to followed by an advisory board in an inquiry
Both the Parliament and the State legislature can make laws related to preventive detention</td></tr>
<tr><td rowspan="2">Right Against Exploitation</td><td>Article 23
Prohibits traffic in human beings and forced labour</td><td colspan="2">Traffic in human beings includes:
• Selling or buying of men, women and children
• Immoral traffic in women and children, including prostitution
• Devadasi-practise of marrying young girls or women to God.
• Slavery
Forced labour includes:
• labour forced by use of physical force
• Labour forced by economic compulsion, i.e. below minimum wages
• Bonded labour
State can impose compulsory public service, like military or social service, without pay and without discriminating on grounds of religion, race, caste or class in imposing the compulsory services.</td></tr>
<tr><td>Article 24
Prohibits employment of children in factories</td><td colspan="2">• Children below the age of 14 years cannot be employed in any factory, mine, and any hazardous place.
• Children can be employed in any harmless or innocent work.
• Parliament enacted The Child Labour (Prohibition and Regulation) Amendment Act, 2016 to implement the provision</td></tr>
<tr><td rowspan="4">Right to Freedom of Religion</td><td rowspan="4">Article 25
Guarantess Freedom of conscience, free profession, practice and propagation of religion</td><td>Freedom of Conscience</td><td>Can choose (not choose) a relation with God as per their desires.</td></tr>
<tr><td>Free Profession</td><td>Can freely declare their religious beliefs and faith freely and openly</td></tr>
<tr><td>Freedom of practice</td><td>Can perform religious worship, rituals, ceremonies and exhibit beliefs and ideas</td></tr>
<tr><td>Freedom of propagation</td><td>Can transmit and disseminate one's religious beliefs to others.
Does not include right to forcible conversion as it impinges upon Freedom of conscience</td></tr>
</table>

Right to Freedom of Religion	**Article 25** *Guarantess Freedom of conscience, free profession, practice and propagation of religion*	• It covers and guarantees an individual's religious rights • It covers both religious doctrines and religious practices. • State can regulate or restrict any economic, financial, political or other secular activity associated with any religious practice. • State can provide for social welfare, religious reforms, opening Hindu religious institutions of a public character to all classes and sections of Hindus. • Wearing and carrying of kirpans is deemed as profession of the Sikh religion. • State can subject these to public order, morality, health and other provisions relating to Fundamental Rights.
	Article 26 *Guarantees Freedom to manage religious affairs*	***Protects collective freedom of a religious denomination by allowing them:*** • To establish and maintain institutions for religious and charitable purpose • To manage its own affairs in matters of religion • To own and acquire movable and immovable property • To administer such property in accordance with law *It is subject to public order, morality, health but not to other provisions relating to Fundamental Rights*
	Article 27 *Freedom as to payment of taxes for promotion of any particular religion*	• State cannot spend public money collected through tax for promotion or maintenance of any particular religion. • This ensures State does not favour, patron and support one religion over other. • It does not prohibit the State from levying a fee for administration of religious institutions or on ➢ Pilgrims to provide them some safety measures and/or special services ➢ Religious endowments for the regulation expenditure
	Article 28 *Freedom from attending religious instructions in certain educational institutions*	• Religious instruction is prohibited at educational institutions wholly maintained out of State Funds • Religious instruction is permitted at educational institutions established under endowment but administered by State • Religious instruction is permitted only after consent (i.e. on voluntary basis) at educational institutions recognised by State or receiving aid from State. • It allows government to maintain distance from any particular religion and its doctrines • It helps preserve and sustain secularism as laid down in the preamble to the Constitution.
Cultural and Educational Rights	**Article 29** *Protects interests of minorities*	• Minorities can conserve their language, script or culture • State cannot discriminate against citizens on the basis of religion, race, caste, language in admission into any educational institution maintained by the State or receiving aid out of State funds. *According to the Supreme court:* • These provisions are not restricted to minorities only: they are also available to majority. • Right to conserve language also includes the right to agitate for the protection of the language.
	Article 30 *Right of minorities to establish and administer educational institutions*	• All minorities, religious or linguistic, can establish and administer educational institutions. • State cannot discriminate against any minority group managed educational institutions while granting aid. • The compensation amount fixed by the State for compulsory acquisition of any property of a minority educational institution shall not restrict the right guaranteed to them (added by 44th Constitutional Amendment Act, 1976) • Minorities can to impart education to their children in their own language.

Saving Certain Laws	**Article 31A** *Saving laws providing for acquisition of estates*	• Inserted through Constitution (First Amendment) Act, 1951. • It protects laws made by Parliament from being void for inconsistency with Article 14 or Article 19.	
	Article 31B *Validation of certain Acts and Regulations in the 9th Schedule*	• Inserted by First Constitution Amendment Act, 1951 • It prevents a bill from being challenged in the Court, if it is specified in the Ninth Schedule. • In I R Coelho v. State of Tamil Nadu (2007), Supreme Court held that post 24-April 1973 all laws (including those in the Ninth Schedule) would be open to Judicial Review if they violated article 14, 19, 21 or Basic structure of the constitution.	
	Article 31C *Saving of laws giving effect to certain Directive Principles*	• Inserted by Constitution (Twenty-Fifth Amendment) Act, 1971. • Protects laws implementing Directive Principles (Article 39(b) & (c)) from invalidation under Articles 14 or 19. • If the Parliament certifies that the bill intends to ensure equitable distribution of material resources or to prevent concentration of economic power, the bill can't be challenged in court.	
Right to Constitutional Remedies	**Article 32** *Remedies for enforcement of Rights conferred by this part*	• Individuals can approach the Supreme Court for the enforcement/ infringement of their Fundamental Rights. • Supreme Court can issue special orders or writs or directions for enforcement of the Fundamental Rights. • Parliament can empower any other local court to issue direction or writs without impairing the powers of the Supreme Court. • State cannot suspend the Right to move the Supreme Court except as provided by the Constitution under Article 359.	
		Habeas Corpus	• To ensure the release of a person who has been unlawfully detained. • Issued to authorities or private individuals. • Not applicable for lawful detention, contempt of court, or beyond jurisdiction.
	Article 32 *Remedies for enforcement of Rights conferred by this part*	***Mandamus***	• To direct a public official or authority to perform a duty they are legally bound to perform. • Not issued to private entities, discretionary duties, contractual obligations, or constitutional heads (President, Governor).
		Prohibition	• To prevent a lower court or tribunal from exceeding its jurisdiction. • Applicable only to judicial and quasi-judicial authorities
		Certiorari	• To quash an order passed by a lower court, tribunal, or authority. • Preventive and corrective: includes administrative actions affecting individual rights.
		Quo Warranto	• To inquire into the legality of a person's claim to a public office. • Can be sought by any interested person

Right to Constitutional Remedies	**Article 33** *Power of Parliament to modify the Rights conferred by this part in their application to forces, etc.*	• Only Parliament may, by law, determine the extent and restrict any right conferred by Part III. • Such laws cannot be challenged in courts for contravening with Fundamental Rights • A law enacted by Parliament to give effect to the provisions of Article can exclude tribunals under the military law (i.e. Court Martials) from the writ jurisdictions of both Supreme Court and High Courts, with regards to enforcement of Fundamental Rights.
	Article 34 *Restrictions on rights during martial law*	• Fundamental Rights can be restricted while martial law is in force. • Parliament can indemnify any person of acts done in connection with maintenance of law and order. • Parliament can validate any sentence passed, punishment inflicted, forfeiture ordered or other act done under martial law.
	Article 35 *Legislation to give effect to part III provisions*	***Only Parliament (not any State Legislature) can make laws for*** • Residence as a condition for employment • Empowering subordinate courts to issue writs for enforcing fundamental rights • Restricting rights of armed forces under Article 33. • Indemnifying acts under martial law (Article 34). • Prescribe punishment for offences under Part III: i.e. Untouchability, Human Trafficking, and Forced Labour

India in 18th Century

<table>
<tr><th colspan="3">Political Conditions of 18th-Century India</th></tr>
<tr><td colspan="3">Later Mughals</td></tr>
<tr><td>Aurangzeb</td><td colspan="2">Died in 1707 after long reign of nearly 50 years.</td></tr>
<tr><td>Bahadur Shah
1707-1712</td><td colspan="2">• Emerged victorious in war of succession following Aurangzeb's death
• Followed policy of compromise and conciliation
• Granted Marathas right to collect sardeshmukhi (9-10 % of land revenue) of Deccan.
• Faced regional struggles in
➢ Amber and Marwar over demands of Mansabdari.
➢ Malwa and Gujrat over the offices of Subedar.
• Granted high Mansab (rank) to Guru Gobind Singh.
• Faced Sikh revolt under Banda Bahadur over control of Sutlej and Yamuna
• Supported by Jats and Bundellas against Sikhs.
• Released Shahu (who had been imprisoned by Aurangzeb) from jail.
• Died in 1712, hereafter nobles began to play the role of king makers e.g. Zulfiqar Khan.</td></tr>
<tr><td rowspan="2">Jahandar Shah
1712-13</td><td colspan="2">• Won the war of succession with the aid of Zulfiqar Khan.
• Defeated by Farrukh Siyar at Agra in 1713</td></tr>
<tr><td>Zulfiqar Khan</td><td>• Abolished Jizyah/Jizya.
• Gave Jai Singh of Amber the title of Mirza Raja Sawai and appointed him Governor of Malwa.
• Awarded Ajit Singh of Marwar the title of Maharaja and appointed him Governor of Gujarat.
• Granted Marathas Chauth (25 per cent of land revenue) and Sardeshmukhi of Deccan.
• Encouraged Ijarah or revenue farming:
➢ Right to collect revenue was given to middlemen for fixed amount of money.
➢ Middleman were allowed to collect as much revenue as they pleased from the peasants.
➢ Led to oppression of peasants at the hands of middlemen.
➢ Influenced the British revenue administration in the initial years.</td></tr>
<tr><td rowspan="2">Farrukh Siyar
1713-19</td><td colspan="2">• Defeated Jahandar Shah with the aid of Sayyid brothers
• Renewed the farman, granting English East India company (EEIC) right to trade duty free in Bengal, in 1717
• Killed by his nobles (Sayyid brothers)</td></tr>
<tr><td>Sayyid brothers
(Abdullah Khan and Husain Ali Khan)</td><td>• Popularly known as King makers
• Abdullah Khan became wazir
• Hussain Ali Khan Barahow became Mir Bakshi
• Granted Sahu swarajya (of Shivaji) and right to collect Chauth and sardeshmukhi of six provinces of Deccan
• Deposed and killed Farrukh Siyar in 1719
• Made Muhammad Shah the Emperor of India in 1719.
• Hussain Ali Khan was assassinated, while Abdullah Khan was defeated at Agra in 1720
• Abolished Jizya and Pilgrim tax
• Offered high positions to Rajputs</td></tr>
</table>

Muhammad Shah 1719-1748	***Neglect of State Affairs***	• Focused on ease and luxury, neglecting administration. • Nizam-ul-Mulk, frustrated with court politics, left to establish Hyderabad as an independent state. • Petty zamindars, rajas, and nawabs frequently rebelled.
	Expansion of Marathas	• Maratha sardars expanded northward, capturing Malwa, Gujarat, and Bundelkhand. • Peshwa Baji Rao I invaded Delhi in 1737
	Nadir Shah's Invasion (1738–1739)	*Reasons* • Attraction to India's wealth. • Persia's financial crisis and need to fund its army.
		Attacks • *Battle of Karnal (*1739): Mughal army defeated; Muhammad Shah was taken prisoner. • Nadir Shah plundered Delhi (*total plunder estimated at Rs 70 crores*), massacred citizens, and looted treasures, including: ➢ Koh-i-Noor diamond. ➢ Peacock Throne of Shahjahan.
		Reasons for Mughal Defeat • Neglect of North-West frontier defense. • Delayed response to incoming attacks. • Disunity, poor leadership, and mutual distrust. • Weak Mughal army and administration.
		Consequences • Lost provinces west of the Indus and Kabul • Irreparable loss of prestige. • Exposure of Mughal weaknesses to Marathas and foreign powers. • Administration and finances crippled. • Nobles exploited peasants to recover lost wealth. • Intensified internecine conflicts among nobles. • Vulnerability to invasions from the North-West.
	Ahmad Shah Abdali (1748–1767) Invasions	• Repeated invasions of North India, including Delhi and Mathura. • Further devastated the Mughal Empire. *Third Battle of Panipat (*1761) • Ahmad Shah Abdali allied with Najib-ud-daulah (Rohilkhand) and Shuja-ud-daulah (Nawab of Awadh). • Marathas were supported by Imad-ul-Mulk. • Abdali defeated the Marathas, ending their dominance but failing to establish Afghan rule. • Najib-ud-daulah was made Mir Bakhshi by Abdali in 1757. **Note:** *Mughal rulers who faced Abdali's invasions; Muhammad Shah, Ahmed Shah, Aalamgir II and Shah Aalam II.*
	Legacy of Muhammad Shah's Reign	• Fragmentation of the Mughal Empire due to weak leadership. • Repeated invasions weakened the empire further. • By 1761, the Mughal Empire was reduced to the Kingdom of Delhi, with rulers serving as nominal figureheads.

Shah Alam II (1759–1806)	***Early Reign and Exile***	• Ascended the throne in 1759 but spent early years wandering, fearing his wazir.
	Battle of Buxar (1764)	• Allied with Mir Qasim (Nawab of Bengal) and Shuja-ud-Daula (Nawab of Awadh) against the East India Company (EEIC). • Defeated by the British. • *Consequences*: ➢ Signed Treaty of Allahabad 1765 ➢ Granted Diwani rights of Bengal, Bihar, and Orissa to the EEIC. ➢ Lived in Allahabad as a pensioner of the EEIC.
	Return to Delhi	Returned to Delhi in 1772 under Maratha protection.
	Battle of Patparganj 1803	• Between British (*General Lake*) and Marathas (General Louis Bourqin) and Sardar Rau Saheb Wable. • British control was established after defeating Marathas. • Mughal emperors became nominal rulers. • Remained symbolic figures until the dynasty's abolition in 1857.
Cause of Mughal Decline	• *Aurangzeb's Policies*: Alienated allies (e.g., *Rajputs*) through his anti-hindu policies and strained financial resources through his long Deccan campaigns. • *Economic Crisis*: Agrarian unrest, jagirdari crisis (*the number of mansabdars increased to a point where they had to wait for years to get jagirs*), and inflation weakened finances. • *Technological Lag*: Outdated industries and military fell behind European advancements. • *Weak Rulers*: Ineffective successors and factional infighting among nobles eroded governance. • *Military Decline*: Frequent setbacks, lack of naval power, and internal army conflicts reduced strength. • *Regional Aspirations*: Revolts (e.g., *Marathas*, *Sikhs*) and rise of autonomous states diminished control. • *Foreign Invasions*: Nadir Shah and Abdali's invasions and consequent plundering drained resources and prestige of the empire. • *European Powers*: Exploited instability, hastening Mughal decline.	
Emergence of Regional States in India Post 1707		
Causes of Emergence	• Decline of the Mughal Empire after Aurangzeb's death in 1707. • Some states arose under Mughal governors asserting independence due to weakening central authority. • Others were established through rebellions against Mughal rule.	
Characteristics of the States	• *Acknowledged Mughal Supremacy*: Sought approval and sent regular tributes to the emperor. • Adopted, retained or modified Mughal administrative structures and institutions. • *Decentralized political authority.* • *Adopted Secular Policies*: Did not discriminate on religion in public appointments. • *Established Law and Order*: Curbed local officials and petty chiefs from exploiting surplus peasant produce. • *Faced Economic Challenges*: ➢ Conflicts among zamindars and jagirdars over diminishing agricultural revenue. ➢ Worsening conditions for peasants. • *Role in Mughal Decline*: These states contributed to the fragmentation and eventual downfall of the Mughal Empire	

Successor States		
Hyderabad		
Establishment	• Founded *by* Asaf Jah (*also known as Chin Quilich Khan*) of Turani Noble group. • Consolidated control over six subas of the Deccan, with Hyderabad as the capital. • Died in 1749	
Bengal		
Establishment	Murshid Kuli Khan made the state independent of central authority since 1717.	
Murshid Kuli Khan	• Also known as Kartalab Khan • Was appointed diwan (*collector of revenue*) of Bengal by Aurangzeb in 1701 • Appointed governor of Bengal by Farrukh Siyar in 1717 • For the first time both the post of diwan and governor were given to any noble • Regularly sent tributes to Mughal emperor	
	Reforms	• Introduced revenue farming in Bengal • Hastabood System, to calculate the Zamindar's payment to the State based on rent collection. • Appointed Amils (*Collector of Revenue in 18th Century*) • Introduced the Mal Zamini system to modify and improve the Jagirdari Sysytem. • Divided provinces into administrative divisions known as Chaklahs
	Uprisings	• Faced uprisings by ➢ Sitaram Ray, Udai Narayan and Ghulam Muhammad ➢ Shujat Khan ➢ Najat Khan • Succeeded by his son in law Shuja-ud-din in 1727
Alivardi Khan	• Became the Nawab by killing Sarfaraz khan, son of Shuja-ud-din, in 1739. • Prohibited English and French companies from fortifying their factories in Calcutta and Chandernagore. • Was constantly troubled by repeated Maratha invasions. • Ceded a large part of Odisha to Marathas. • Wealthy merchants like Jagath Seth (treasurer of Provincial government) emerged.	
Awadh		
Establishment	• Founded by Saadat Khan Burhan-ul-Mulk • Was ruled by Nawabs from 1720-1856. • Ayodhya and Faizabad were the two important Capitals	
Saadat Khan Burhan-ul- Mulk (1722-1739)	• Was appointed governor of Awadh in 1722. • Introduced a new revenue settlement in 1723, with assessment of actual productivity of the land and imposed a fixed rate of revenue. • Succeeded by his nephew Safdar Jang in 1739	
Safdar Jang (1739 -1754)	• Appointed as the Mughal Emperor's wazir in 1748. • Helped stabilise Avadh and Allahabad through alliances with the Marathas. • Faced Rohelas and the Bangash Pathans revolt • Lucknow became cultural and economic hub in arts and literature. • Development of 4 Gharanas; Khayal, Thumri, Dhrupad, and Tappa . • Signed the treaty of Lucknow in 1801 with East India Company and Saadat Ali Khan. • Under this treaty British Resident was posted in Lucknow court. • Nawab Asaf-ud-daulah (1775-1797) led the major cultural developments in Awadh	

<table>
<tr><th colspan="3">Rebellion States</th></tr>
<tr><td colspan="3">States that arose due to rebellion by local chieftains, Zamindars and peasants against Mughal authority. E.g.
• A dominant peasant clan in western India.
• Sixteenth century soldiers in the armies of sultans of Bijapur and Ahmednagar.</td></tr>
<tr><th colspan="3">Marathas</th></tr>
<tr><td>Establishment</td><td colspan="2">• Established under Shivaji, the Marathas challenged Mughal authority in the Deccan.
• Posed the most significant challenge to the declining Mughal Empire.
• Maratha aspirations were shattered by their defeat in the Third Battle of Panipat (1761).</td></tr>
<tr><td>Shahu
(1707–1749)</td><td colspan="2">• Grandson of Shivaji, imprisoned by Aurangzeb since 1689 and released in 1707.
• Faced a civil war with his aunt Tara Bai, who led an anti-Mughal struggle.
• Established the institution of Peshwa (Chief Minister), which became hereditary.
• Died in 1749, marking the rise of Peshwa dominance.</td></tr>
<tr><th colspan="3">Peshwas (Maratha Prime Ministers)</th></tr>
<tr><td rowspan="2">Balaji Vishwanath
(1713–1720)</td><td colspan="2">• Balaji Vishwanath was appointed the first Peshwa by Sahu.
• Concentrated power in his office and eclipsed other ministers and seniors became official head of Maratha administration after death of Sahu in 1749.
• Became the official head of Maratha administration after death of Sahu in 1749</td></tr>
<tr><td>Key Achievements</td><td>• Secured chauth and sardeshmukhi from the Mughal Empire, consolidating Maratha finances.
• Assisted the Saiyid Brothers in overthrowing Farrukh Siyar in 1719.
• Centralized power in the Peshwa office, overshadowing other ministers.
• Died in 1720 and was succeeded by Baji Rao I</td></tr>
<tr><td rowspan="2">Baji Rao I
(1720–1740)</td><td colspan="2">Greatest exponent of guerrilla tactics after Shivaji.</td></tr>
<tr><td>Maratha Expansion</td><td>• Extended Maratha control to Malwa, Gujarat, and Bundelkhand.
• Fought campaigns against the Nizam of Hyderabad, the Sidis of Janjira, and the Portuguese.
• Died in 1740.</td></tr>
<tr><td rowspan="3">Balaji Baji Rao
(Nana Saheb,
1740–1761)</td><td colspan="2">• Most successful among the Marathas
• Attacked Ali Vardi Khan and annexed Odisha into Maratha Empire
• Shifted the Maratha capital to Poona.</td></tr>
<tr><td>Achievements</td><td>• Conquered Bengal and defeated the Nizam of Hyderabad.
• Installed Imad-ul-Mulk as Wazir in Delhi (1752).
• Brought Mughal Emperor under the protection of Marathas</td></tr>
<tr><td>Third Battle of Panipat (1761)</td><td>• Fought Ahmad Shah Abdali, Najib-ud-Daula and Shuja-ud-Daula.
• Faced a devastating defeat resulting in the death of key commanders (Vishwas Rao and Sadashiv Rao Bhau).
• The loss significantly weakened Maratha power.</td></tr>
<tr><td>Madhav Rao (1761–1772)</td><td colspan="2">• Restored Maratha power, defeating the Nizam of Hyderabad and Haidar Ali of Mysore.
• Reinstated Mughal Emperor Shah Alam II in Delhi (1771).
• His death in 1772 led to internal conflicts and weakened Maratha unity.
• Allowed the British to exploit divisions, leading to the First Anglo-Maratha War (1775–1782).
• Replaced by the British as the dominant power in India.</td></tr>
</table>

Sikhs	
Establishment	• Sikh religion was founded by Guru Nanak in 15th century. • It spread among Jat peasantry and other lower castes in Punjab. • Guru Hargobind (*sixth guru*) began the process of transforming the community into a militant and fighting one. • Guru Gobind Singh (tenth guru) transformed the community into a military and political force. • From 1699 Guru Gobind Singh constantly waged war against Aurangzeb and other Rajas. • After Guru Gobind Singh's death the institution of guru was abolished and leadership passed on to Banda Bahadur in 1708. • After the invasions of Nadir Shah and Ahmad Shah Abdali the Sikh once again rose in rebellion against Mughals.
Organisation	• Sikh community organised themselves into 12 misls under Ranjit Singh. • Were based on principle of equality (*all members had equal voice in deciding the affairs and in electing its chief and other officers*)..
Ranjit Singh	• Chief of Sukerchakia Misl. • Captured Lahore in 1799 and Amritsar in 1802. • Organised a powerful army along European lines with European instructors. • Hired soldiers from all over India with different castes and sects
Decline	• Lost the democratic character and began to be dominated by powerful chiefs • Khalsa projected the Sikh Community as a Militant outfit. • Dal Khalisa was more democratic group with a chosen leader.
Afghans	
Bangash Pathan	Muhammad Khan Bangash established a principality in Farrukhabad during the reign of Farrukh Siyar and Muhammad Shah.
Rohelas	• After Nadir Shah's invasion, Ali Muhammad Khan carved out a separate principality-Rohilkhand. • Capital at Aolan (Bareily) and later at Rampur.
Rajputs	
Establishment	• Had co-existed since the tenth century. • Successors of Aurangzeb had a conciliatory approach towards them. • Took advantage of declining Mughal power to virtually free themselves from central control. • Most outstanding Rajput ruler of the 18th century was Raja Sawai Jai Singh of Amber.
Sawai Jai Singh (1681-1743)	• Founded city of Jaipur, based on scientific principles and built according to a regular plan. • Built observatories (Jantar Mantar) at Delhi, Jaipur, Ujjain, Varanasi, and Mathura. • Drew up a set of tables, Zij-i Muhammadshahi, to help people make astronomical observations. • Got Euclid's "Elements of Geometry" translated into Sanskrit. • Tried to enforce a law to reduce lavish expenditure by Rajput on daughter's wedding which often led to infanticide.
Jats	
Establishment	• A community of agriculturists around Delhi, Agra, and Mathura. • Repression by Mughal officials resulted in revolt by Jat peasants around Mathura in 1669 and 1688.
Bharatpur	• Established by Churaman and Badan Singh. • The state reached its highest glory under Suraj Mal.
Suraj Mal	• The Jats reached their peak. • Added regions like Agra, Mathura, Meerut, and Aligarh.

<table>
<tr><th colspan="3">Mysore</th></tr>
<tr><td>Background</td><td colspan="2">• Had maintained independence since the end of the Vijaynagara Empire.
• Early in 18th century two ministers Nanjaraj (Sarvadhikan) and Devraj (Dulwai) seized power reducing king Chikka Krishna Raj to a mere puppet.
• In 1761, Haider Ali overthrew Nanjaraj and established his authority over the state.</td></tr>
<tr><td rowspan="2">Haider Ali (1761-1782)</td><td>Establishment</td><td>• Started his career as a petty officer in the Mysore army.
• Gradually rose in the Mysore army.
• In 1755 he established a modern arsenal in Dindigul with the help of French experts.</td></tr>
<tr><td>Expansion</td><td>• Annexed northern Kerala up to Cochin, including territories of Zamorin of Calicut.
• In 1769, he repeatedly defeated the British forces.
• Died in 1782 during the course of second Anglo-Mysore War.
• Was succeeded by his son Tipu.</td></tr>
<tr><td rowspan="2">Tipu Sultan (1782-99)</td><td>Reforms</td><td>He introduced:
• new calendar
• new system of coinage
• new scales of weights and measures
• Showed keen interest in the French Revolution
➢ planted a “Tree of Liberty at Sringapatam
➢ became a member of a Jacobin Club</td></tr>
<tr><td colspan="2">• His infantry was armed with muskets and bayonets, which were manufactured in Mysore
• Even tried to set up a trading company on the pattern of European companies
• Sent embassies to Iran and Pegu to develop foreign trade
• After 1796, made an effort to build a modern navy
• In 1791, gave money for construction of goddess Sarda in the Shringeri Temple
• Died in 1799 during the fourth Anglo-Mysore war</td></tr>
<tr><th colspan="3">Kerala</th></tr>
<tr><td>Establishment</td><td colspan="2">• At beginning of the 18th century, Kerala was divided into a large number of feudal chiefs and rajas.
• Prominent ones were Calicut, Chirakkal, Cochin and Travancore.
• After 1729, Travancore rose into prominence under Martanda Varma.
• Conquered Quilon and Elayadam, and defeated the Dutch.
• Expanded from Kanya Kumari to Cochin.</td></tr>
<tr><td>Martanda Varma</td><td colspan="2">• Organized a strong army on western model with the help of European officers and armed it with modern weapons.
• Also constructed a modern arsenal.
• Was succeeded by Rama Varma.</td></tr>
<tr><th colspan="3">Carnatic</th></tr>
<tr><td>Establishment</td><td colspan="2">• One of the subahs of the Mughal Deccan, under the authority of Nizam of Hyderabad
• In 1710 Sayyad Muzafar became the Nawab with the name of Sadat-ulla-khan.
• He ruled up to 1732 and succeeded by Dost Ali.
• After Dost Ali, Nawab Anwar-ud-din ruled but was killed by Chanda Sahib with the support of French.</td></tr>
</table>

Social and Economic Conditions of 18th-Century India		
Economic Conditions	**Agriculture and Taxation**	• Agricultural techniques remained stagnant, leading to low productivity. • Peasants faced heavy taxation by the state and landowners, rarely benefiting from their labor. • Poverty was widespread due to increasing tax burdens, exploitation, and constant warfare, while the elite enjoyed luxury.
	Handicrafts and Trade	• India was self-sufficient in handicrafts and agriculture, exporting cotton textiles, spices, and silk. • Political instability, invasions, and heavy customs duties disrupted internal and foreign trade but not severely. • India remained a hub for manufacturing, especially textiles, shipbuilding, and craftsmanship.
	European Trading Influence	• European trading companies boosted demand for Indian goods, particularly textiles and ships. • Indian exports like cotton textiles, silk, and spices continued to dominate global markets.
Education	• Was outdated, emphasized on ancient texts. • literature, law, religion, and philosophy were studied with limited practical knowledge or innovation. • Sanskrit was used for higher education by Hindus, while Persian was used by both Hindus and Muslims. • Elementary education focused on reading, writing, and arithmetic and was mainly accessible to higher castes. • Education for girls was rare and limited to higher-class women. • Literacy rates were comparable to British rule but remained basic and functional.	
Social and Cultural Life	**Caste and Religion**	• Hindus were governed by caste system, defining social status and occupation. • Muslims were similarly divided by caste, tribe, and status, with Hindu converts often retaining caste distinctions. • Muslim subgroups include, Irani, Turani, Afghani, Hindustani nobles and the commoners were divided among the Ajlaf and Sharif Muslims • Instances of caste mobility, such as the rise of the Holkar family, were exceptions. • Slavery was prevalent
	Gender Roles	• Patriarchy prevailed, with men holding authority over women. • Early marriages and dowry were common, especially in Bengal and Rajputana. • Widows faced severe restrictions, though some regions permitted remarriage.
	Art and Architecture	• Decline in Mughal architecture and painting was evident, but regional styles like Kangra and Rajput painting flourished. • Jaipur emerged as a center of architectural innovation.
	Literature	• Urdu poetry thrived, with poets like Mir and Sauda gaining prominence. • Regional literature in languages like Malayalam and Sindhi developed significantly
	Science and Technology	• India stagnated in scientific and technological advancements, remaining disconnected from Europe's scientific revolution.

India-Location

Location	• Entirely in northern hemisphere and eastern hemisphere. • 8°4'N and 37°6'N latitudes and 68°7'E and 97°25'E longitudes • Tropic of Cancer (23° 30'N) divides the country into almost two equal parts (passes through 8 states: GJ, RJ, MP, CH, JH, WB, TP, MZ) • Southern part of the country lies within the tropics • Northern part lies in the sub-tropical zone or the warm temperate zone		
Size	• Area of 3.28 million square km • Total area accounts for about 2.4 % of the world's total land area. • Is the seventh largest country of the world		
Extent	• Latitudinal and longitudinal extent is 29 degrees. • North to South 3,214 km • East to West is 2,933 km • Territorial limit extends towards the sea up to 12 nautical miles (1.8 km *12)		
Extremes	• Northernmost point Indira Col in Siachen Glacier in Jammu and Kashmir • Southernmost point of India Indira Point in Andaman and Nicobar Island • Southernmost point of mainland cape Camorin or Kanyakumari • Easternmost state: Arunachal Pradesh; Westernmost State: Gujarat • Note: Assam is connected to the rest of India via a 22-km land strip in West Bengal, popularly known as 'Chicken's Neck', near Siliguri		
Boundary	• Land boundary of about 15,200 km and 6100km long coast line. • Has land boundary with Pakistan, Afghanistan, China, Nepal, Bhutan, Myanmar, Bangladesh • Has longest boundary with Bangladesh		
Coastline	• Peninsular part of India extends towards Indian Ocean • Mainland has coastline of 6,100 Km • Geographical coastline of 7,517 (7516.6) km • 9 States with coastline: Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Odisha, Bengal • Gujarat has the longest coastline		
Subcontinent	• India together with Pakistan, Nepal, Bhutan and Bangladesh forms a geographic entity and has unique regional identity • Bound by Himalayas in north, Hindukush and Sulaiman ranges in northwest, Purvachal hills in north-east, Indian Ocean in South		
Indian Standard Meridian	• 82°30'E passes through Mirzapur (Uttar Pradesh) • Indian standard time (IST) calculated on basis of Indian Standard Meridian is GMT+5:30 hrs • Passes through 5 states UP, MP, Chhattisgarh, Odisha and Andhra Pradesh • Council of Scientific & Industrial Research's National Physical Laboratory (CSIR-NPL) maintains Indian Standard Time		
	Two time Zones	***Reasons***	• Demand is based on huge difference in daylight (2 hrs) times between Arunachal Pradesh and Gujarat • Early sunrise in Northeast causes loss of many daylight hours by the time offices or educational institutions open • Early sunset leads to higher consumption of electricity
		Proposal	• A paper by NPL has proposed second ISM at 89°52'E (GMT+6:30 hrs) passing through "chickens neck" region • States west of the line would continue to follow IST • States east of the line — Assam, Meghalaya, Nagaland, Arunachal Pradesh, Manipur, Mizoram, Tripura, Andaman & Nicobar Islands —would follow IST-II
		Significance	Would save 20 million kWh of electricity a year

Atmosphere

Definition	Blanket or envelope of mixture of different gases that surround the Earth.		
Significance	• Provides air we breathe. • Protects us from harmful effects of the Sun's Ultraviolet (UV) rays. • Helps maintain a liveable temperature on Earth.		
Composition	***Gases***	***Nitrogen***	• Most abundant gas (78.08 % by volume) • Required by plants to create chlorophyll for photosynthesis • Plants cannot fix nitrogen from the air • Cyanobacteria (also known as blue-green algae) fixes atmospheric nitrogen. E.g. Nostoc and Anabaena • Rock Nitrogen: 26 % of nitrogen in the natural ecosystem is sourced from rocks; its availability is determined by physical or chemical weathering
		Oxygen	• Second most abundant 20.95 % by volume of the atmosphere • Produced by plants during photosynthesis • Required by humans and animals for survival • Almost negligible in quantity at the height of 120 Km.
		Carbon Dioxide	• Fourth largest gas by volume in the atmosphere • Its share in the atmosphere has been increasing in recent times due to burning of fossil fuels • Largely responsible for greenhouse effect: Transparent to incoming solar radiation but opaque to outgoing terrestrial radiation • Responsible for Global Warming: increase in temperature of Earth due to increased heating from greenhouse effect • Produced by • Humans and animals during respiration • Burning of fossil fuels
		Ozone	• Confined between 10 and 50 km above Earth's surface mainly in the Stratosphere. • Acts as a filter and absorbs 99.5% of ultra-violet rays radiating from the sun. • In Lower layers it is a potent Greenhouse Gas (Ghg).
		Argon	Third most abundant gas (0.93 % by volume) in the atmosphere
Composition	***Water Vapour***	• Variable gas, which decreases with altitude. • 4 % of the air by volume in warm and wet tropics. • Less than 1 % of the air in dry and cold areas of desert and polar regions • Decreases from equator towards poles. • Absorbs parts of the insolation from the sun and preserves the earth's radiated heat. • Acts like a blanket allowing the earth neither to become too cold nor too hot. • Contributes to the stability and instability in the air.	

Dust Particles	• Include sea salts, fine soil, smoke-soot, ash, pollen, dust and disintegrated particles of meteors • Mainly concentrated in the lower layers of the atmosphere • Convectional air currents may transport them to great heights • Higher concentration found in subtropical and temperate regions due to dry winds in comparison to equatorial and polar regions • Act as hygroscopic nuclei around which water vapour condenses to produce clouds.	
Structure of Atmosphere	***Troposphere***	*Lowermost Layer* • Average height is 13 km (height of 8 km near the poles and about 18 km at the equator) • Thickness of is greatest at equator because heat is transported to great heights by strong convectional currents. • Contains dust particles and water vapour • All changes in climate and weather take place in this layer • temperature decreases at the rate of 1° C for every 165m of height. • Decrease in temperature with increase in altitude.
	Tropopause	• Zone separating the troposphere from stratosphere • Temperature here is nearly constant, and hence the name tropopause
	Stratosphere	• Above the tropopause and extends up to a height of 50 km • As it is free from clouds and weather events, it ideal for flying aeroplanes • Contains the ozone layer • Temperature increases in this layer with increase in height due to ozone molecules absorbing solar UV radiations
	Stratopause	Zone separating stratosphere and mesosphere
	Mesosphere	• Extends up to a height of 80 km • Temperature starts decreasing with the increase in altitude (-80 C at 80 Km) • Meteorites burn up in this layer on entering from the space • 'Noctilucent clouds' or 'polar mesospheric clouds' sometimes form here near the poles.
	Mesopause	Zone separating mesosphere and thermosphere
	Thermosphere	• Thickest layer; located between 80 and 400 km • Contains electrically charged particles known as ions • Radio waves transmitted from the earth are reflected back to the earth by this layer. • Ionosphere found here; exhibits northern lights or aurora borealis • Temperature starts increasing with height consists of minor concentrations of oxygen ions (O+), molecular oxygen (O_2+) and molecular nitrogen ions (N_2+) which can effectively absorb UV-radiations. • Satellite freely orbits around the earth above 550 kms.
	Exosphere	• Uppermost layer • Light gases like helium and hydrogen float into the space from here

In News	*Ozone hole Recovery*	*Recovery*	• Antarctic ozone hole is recovering at rate of 1-3 % per decade according to UN study. • Expected to attain 1980 levels in 2060s • Fully recover by 2080
		Ozone hole	• Area above Antarctica where the stratospheric ozone layer is the thinnest due to depletion
		Depletion	• Ozone in the stratosphere is formed by action of UV rays on molecular oxygen • Ozone decomposes into molecular oxygen • Generally, there is a balance between formation and decomposition of Ozone in stratosphere • Balance between formation and decomposition of ozone has been disrupted due to enhanced ozone decomposition by Chlorofluorocarbons (CFCs) • Depletion is occurring widely in the stratosphere but is particularly marked over the Antarctic.
		Chlorofluoro-carbons (CFCs)	• Transporting agents for continuously generating chlorine radicals, which react with ozone • Once released in atmosphere they reach stratosphere • In Stratosphere they are broken down by UV rays, releasing chlorine which reacts with ozone and decomposes it • Used in refrigerators, air conditioners, in production of plastic foam and for cleaning computer parts • Banned by Montreal Protocol
		Montreal Protocol	• Protocol to the Vienna Convention for the Protection of the Ozone Layer • An international treaty to control the usage and emission of ozone depleting substances • Signed at Montreal, Canada in 1987 (effective since 1989) • Bans and phases out ozone depleting substances (CFCs, Hydrochlorofluorocarbons (HCFCs), Halons, Carbon tetrachloride, Methyl bromide and Hydrobromofluorocarbons (HBFCs)).
		Concerns	• an unexpected increase in production and emissions of CFC-11 from eastern Asia since 2012 • Emission of CFC-11 at the same rate could delay recovery of ozone-depleting chemicals to their 1980 values by about 7 and 20 years.

Biotechnology

Meaning	Technology that utilizes biological systems, living organisms or parts of this to develop or create different products.	
Types		
Red Biotechnology	Involves medical processes, such as using organisms to produce new drugs and stem cells to regenerate damaged human tissues and grow and regrow entire organs.	
White or grey Biotechnology	Refers to industrial processes, such as the development of new chemicals or new biofuels for vehicles.	
Green Biotechnology	Covers agricultural processes, such as producing pest-resistant crops, disease-resistant animals and environmentally friendly agricultural practices.	
Gold Biotechnology	• Also known as bioinformatics, is a cross between biological processes and informatics. • Refers to the methods healthcare workers use to gather, store and analyze biological data to treat patients.	
Blue Biotechnology	Encompasses processes in marine and aquatic environments, such as converting aquatic biomass into fuels and pharmaceuticals.	
Yellow Biotechnology	Refers to processes that aid food production, the most popular application being the fermentation of alcohol and cheese.	
Violet Biotechnology	Ensures the practice of biotechnology is in compliance with laws and ethical standards governing each field.	
Dark Biotechnology	Use of biotechnology for weapons or warfare.	
Applications of Biotechnology in Environment Conservation		
Bioremediation	***Meaning***	Introduction of microorganisms into waste sites in order to organically break down nonrecyclable waste.
	Factors Affecting	• Concentration of the contaminant: ➢ Lower the concentration of the contaminants there will be decreasing rate of degrading enzymes produced by bacteria in the soil. • Nutrient availability: ➢ The excessive presence of nitrogen, potassium, and phosphorus shows a negative impact on the degradation of hydrocarbons. • Characteristics of the contaminated soil: ➢ Such as pH, texture, permeability, water holding capacity, temperature, and oxygen availability. • Temperature: ➢ Higher temperature of 30°C-40°c increases the bioremediation in the soil as well as in the marine environment. • Oxygen: ➢ Aerobic biodegradation is much faster than anaerobic biodegradation. o *Aerobic Bacteria:* Acinetobacter, Bacillus, Pseudomonas, Sphingomonas, Flavobacterium, Nocardia, Rhodococcus, Mycobacterium, Chryseobacterium, Achromobacter, Alkanindiges, Alcanivorax, Marinobacter, Thallassolituus, Cycloclasticus, and Oleispira. o *Anaerobic Bacteria:* Dehalococcoides, Geobacter, Sulfurreducens, Shewanella oneidensis, Geothrix fermentans, Methanogens, Desulfovibrio, Clostridium, and Paraclostridium sp. *Note: Plastic-eating bacteria breaks down waste such as plastic in soils and water. E.g. Ideonella sakaiensis*

<table>
<tr><td rowspan="12">Bioremediation</td><td colspan="2">In Situ Bioremediation:
In-site treatment of contaminants using biological agents.</td></tr>
<tr><td>Bio-augmentation</td><td>Strains of natural or genetically engineered bacteria are added to the contaminated site to supplement indigenous microflora and speed up biodegradation.</td></tr>
<tr><td>Bio-stimulation</td><td>Addition of limiting nutrients and electron acceptors like phosphorous, nitrogen, oxygen or carbon in order to stimulate the existing microbial population which are involved in bioremediation. E.g. Most common against petroleum pollutants in soil.</td></tr>
<tr><td>Bio-slurping</td><td>• Also called as multi-phase extraction is the process of in situ aerobic bioremediation of contaminated soils using bioventing and vacuum.
• Limited to 25 feet below ground surface as contaminants.</td></tr>
<tr><td>Bio-sparging</td><td>Injection of a gas and gas-phase nutrients pressure into the saturated zone applying pressure to promote aerobic biodegradation. E.g. Sites affected with lighter to heavier petroleum contaminants</td></tr>
<tr><td>Bioventing</td><td>• Supplying air and nutrients through wells to contaminated soil to stimulate the indigenous microorganism.
• Applied for remediation of petroleum hydrocarbons contaminants in soil.</td></tr>
<tr><td rowspan="2">Phytoremediation</td><td>Meaning:
Use of genetically engineered microorganisms to purify soils of heavy metals and other pollutants.</td></tr>
<tr><td>Advantages:
• Improves plant growth. E.g. Actinomycetes.
• Enhances metal uptake in plants. E.g. of bacteria - Pseudomonas, Bacillus, Serratia, Enterobacter, and Rhodococcus.
• Detoxifies metals into less harmful forms. E.g. - Exudates (peptides) from the bacterium Pseudomonas putida.
• Alleviating stress in plants. E.g. Bacillus, Pseudomonas, and Azospirillum.
Note: Plastic-eating bacteria. E.g. Ideonella sakaiensis.</td></tr>
<tr><td colspan="2">Ex-Situ Bioremediation
Excavation of contaminants and pollutants by subsequent transportation of contaminants from one site to another</td></tr>
<tr><td>Biofiltration</td><td>Purification of contaminated air evolved from volatile organic compounds using various materials like bio-filters, bio-trickling filters, bio-scrubbers, conventional bio-filters etc.</td></tr>
<tr><td>Biopile</td><td>Excavated, contaminated soil is piled and treated to stimulate microbial activity, breaking down pollutants through controlled aeration, moisture, and nutrient addition.</td></tr>
<tr><td>Bioreactor</td><td>Pollutants, either in the dry or slurry form, are fed into the bioreactor vessel for their degradation that facilitate the growth of biological mass.</td></tr>
<tr><td>Composting</td><td>• Self-heating, substrate-dense and solid phase treatment process.
• Process of degradation and decaying of organic waste under favorable controlled conditions with the action microorganisms.</td></tr>
<tr><td>Land Farming</td><td>• Polluted soil transported to above the ground surface allowing aerobic biodegradation of pollutant by autochthonous microorganisms.
• Autochthonous microorganisms are stimulated by tilling process which involves nutrients amendments (nitrogen, phosphorous etc.), aeration process and irrigation.</td></tr>
</table>

Biosurfactants	• Diverse groups of surface-active molecules/chemicalcompounds synthesized by microorganisms. • Produced during the growth of microorganisms on water soluble and water in soluble substrates. • E.g. glycolipids, lipopeptides, phospholipids, neutral lipids or fatty acids and polymeric biosurfactants.	
Genetically Modified Organisms	• Artificially alteration of the DNA structure of the food and claims to create better versions of a specific vegetable or fruit. • GMO may cause toxicity, allergies, nutritional disbalance and many unintended effects on the body. • Genetic restoration attempts to restore endangered species. • Cover-crops such as corn are used as biofuels, replacing traditional fuel sources that produce greenhouse gas emissions when extracted and used.	
Biosensors	• Biophysical devices that can detect and measure the quantities of specific substances in a variety of environments. • E.g. Enzymes, antibodies andeven microorganisms.	
Bio-monitoring	• Measurement and assessment of toxic chemicals or their metabolites in a tissue, excreta or any other related combination. • Involves the uptake, distribution, biotransformation, accumulation and removal of toxic chemicals.	
Wildlife Genetics	• Application of large-scale DNA tools on wildlife for conservation. *Note: Large-scale DNA: Analysing, manipulating, and synthesizing DNA on a massive scale, including sequencing, genotyping, and gene editing.*	
Wildlife Forensics	Synthesis of conservation genetic research and forensic genetic practice to meet the increasing need for investigative tools in wildlife law enforcement.	
Environmental DNA or eDNA	Defined as the genetic material left by organisms in the environment. It includes DNA from cells, tissues, fluids, and excrement.	
Applications of Biotechnology in Medicine		
Biologics	• Used more restrictively for a class of therapeutics that are produced by means of biological processes involving recombinant DNA technology. *Note: Combining DNA from different organisms to create new genetic combinations*	
Biopharmaceuticals	***Meaning***	Known as a biologic(al) medical product, orbiologic, is any pharmaceutical drug product manufactured in, extracted from, orsemisynthesized from biological sources. They structurally mimics compounds found within the body.
	Kinds	Blood factors (Factor VIII and FactorIX), Thrombolytic agents (tissue plasminogen activator), Hormones (insulin, glucagon,growth hormone, gonadotrophins), Haematopoietic growth factors (Erythropoietin, colonystimulating factors), Interferons (Interferons-□, -□, -□), Interleukin-based products(Interleukin-2), Vaccines (Hepatitis B surface antigen), Monoclonal antibodies and variousadditional products like tumour necrosis factor, therapeutic enzymes
DNA Banking	Used to conserve genetic material, especially that of organisms that face extinction.	
Gene Banks	Type of bio-repository which preserve genetic material held for long-term security or for ease of access.	
Gene Therapy	***Meaning***	• Uses a gene(s) to treat, prevent or cure a disease or medical disorder. • Often, it works by adding new copies of a gene that is broken, or by replacing a defective or missing gene in a patient's cells with a healthy version of that gene.

<table>
<tr><td rowspan="11">Gene Therapy</td><td rowspan="4">Types</td><td colspan="2">Somatic Cell Gene Therapy</td></tr>
<tr><td colspan="2">Modifies genes in non-reproductive cells, affecting only the individual treated.</td></tr>
<tr><td colspan="2">Germline Gene Therapy</td></tr>
<tr><td colspan="2">Modifies genes in reproductive cells, potentially passing the change to future generation.</td></tr>
<tr><td rowspan="2">Delivery Method</td><td>Viral Vectors</td><td>Modified viruses can be used to deliver genetic material into cells.</td></tr>
<tr><td>Non-Viral Vectors</td><td>Techniques using nanoparticles or other non-viral methods are also being explored.</td></tr>
<tr><td colspan="3">Different Tools</td></tr>
<tr><td rowspan="3">RNA-based Technologies</td><td>Antisense oligonucleotides (ASOs)</td><td>• Are small, single-or double-stranded oligonucleotides designed to specifically target and modify RNA transcripts to slow down or halt rare genetic disease progression.
• Not all genetic diseases are amenable to ASO-based therapy</td></tr>
<tr><td>RNA interference (RNAi)</td><td>• A mechanism where double-stranded RNA molecules silence genes by degrading mRNA for gene regulation and defense against pathogens.
Note: Andrew Fire and Craig Mello shared the 2006 Nobel Prize in Physiology or Medicine for their discovery of RNA interference (RNAi).</td></tr>
<tr><td>RNA Aptamer</td><td>• Defined as RNA oligonucleotides that bind to a specific target with high affinity and specificity, similarly to how an antibody binds to an antigen.
• Aid in clinical diagnosis of diseases due to their high affinity to bind specific cell markers.</td></tr>
<tr><td>messenger Ribonucleic Acid (mRNA) Vaccine</td><td>• Uses our own body and biological processes to potentially treat diseases and prevent infections.
• Works by introducing a piece of mRNA (messenger RNA) into the body that instructs cells to produce a specific protein, which then triggers an immune response, preparing the body to recognize and fight off the real virus if encountered later.
• Unlike Other vaccines, mRNA does not use a deactivated (“killed”) virus, a weakened virus, or parts of the virus (protein subunit).</td></tr>
<tr><td>Genome Editing Technologies</td><td>CRISPR)-Cas9</td><td>• A single-guide RNA (sgRNA) that contains a sequence that can bind to DNA.
• In Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR)-Cas9 based RNA editing system enzyme acts as a molecular scissor that allows for precise and efficient editing of DNA, creating a gap that can be filled with new DNA.
• CRISPR occurs naturally in some bacteria, as a part of their immune system that limits infections by recognising and destroying viral DNA.
• CRISPR-based tools for diagnostics and therapeutics rely on the ability of the system to recognise specific single-nucleotide changes in the DNA.
Note:
• Nucleotides are the building blocks of DNA and RNA. Each nucleotide consists of a nucleobase, a phosphate group, and a sugar.
• Each nucleotide in DNA has one of four nucleobases: adenosine, thymine, guanine, and cytosine.</td></tr>
</table>

Gene Therapy	*Genome Editing Technologies*	*CRISPR)-Cas9*	*How CRISPR-Cas9 Works?* • Uses a guide-RNA (gRNA) designed to find and bind to a specific part of the target genome. • The gRNA directs an enzyme, Cas9, to the target site, which is followed by a short DNA sequence called protospacer adjacent motif (PAM). • Cas9 recognises and binds to the PAM sequence, and acts as a molecular scissor that snips some damaged DNA. • This automatically triggers the cell's DNA repair system, which repairs the snipped part to insert the correct DNA sequence. *Note: CRISPR-Cas9 system can also recognise and cut parts of the genome other than the intended portion, when SpCas9 enzyme derived from Streptococcus pyogenes bacteria. To overcome these issues, researchers are exploring Cas9 enzymes from Francisella novicida bacteria called FnCas9.*
		Zinc Finger Nucleases	• Consisting of a chimeric programmable nuclease containing a DNA-binding zinc finger domain and a nonspecific FOKl, naturally found in Flavobacterium okeanokoites, endonuclease domain. • Zinc finger domains can be fused with the Fok1 nuclease to engineer a protein that can specifically bind and cleave a gene of interest. • ZFNs are enzymes that are able to cut double-stranded DNA at a specific site. • Used to treat bone marrow cells from patients who are HIV-positive.
		Transcription Activator-Like Effector Nucleases	• Used for precise genome editing in live cells. • Created by combining a TALE DNA-binding domain with a DNA cleavage domain, such as FokI, which creates a double-strand break at the target site.
		Working	• TALE proteins are derived from plant pathogenic bacteria of the genus Xanthomonas. • They bind to specific DNA sequences using a modular system of amino acid repeats. • The amino acid sequence of these repeats determines the specificity of the TALEN enzyme in recognizing and binding to a specific DNA sequence target. • TALENs are designed to target specific DNA sequences, allowing for precise genome editing.
		Base Editing	A CRISPR-based genome editing technique that allows for precise, targeted changes to single DNA bases, like converting a C to a T or an A to a G, without causing double-stranded DNA breaks.
		Prime Editing	• A "search-and-replace" genome-editing technology that enables precise DNA editing, including base substitutions, insertions, and deletions. • Unlike traditional CRISPR-Cas9, it doesn't create double-strand breaks in the DNA or donor DNA template, which can lead to unintended mutations.

<table>
<tr><td rowspan="11">Cell Therapy</td><td>Meaning</td><td>• Combines stem cell- and non–stem cell-based unicellular or multicellular therapies.
• Involves transfer of a specific cell type(s) into a person to treat or prevent a disease.
• Typically employs autologous or allogeneic cells.</td></tr>
<tr><td>Stem Cell</td><td>• Also known as regenerative medicine, uses donor (allogeneic) or the body's own cells (autologous) to repair and regenerate damaged tissues.
• Stem cells are found in small numbers in various tissues in the fetal and adult body, such as bone marrow which produces blood cells.
• Stem cell can be used to grow new cells in a laboratory to replace damaged organs or tissues.
• This therapy, particularly hematopoietic stem cell transplantation, is primarily used to treat blood cancers like leukemia and lymphoma, as well as other blood disorders like aplastic anemia and sickle cell disease.
• They are being studied to treat type 1 diabetes, Parkinson's disease, amyotrophic lateral sclerosis, heart failure, osteoarthritis and other conditions.</td></tr>
<tr><td>Non-Stem cell</td><td>• Utilize somatic cells, like immune cells or specialized T cells, to treat conditions.
• Used to treat cancer, metabolic disorders, or injuries, and include approaches like adoptive cell therapy (ACT) and cell transplantation.
• India's first indigenously-developed CAR T-cell therapy for treatment of cancer was launched last year (2024).</td></tr>
<tr><td colspan="2">Types of Cell Therapy</td></tr>
<tr><td>Blood Transfusion</td><td>Involves replacing blood or blood components (like red blood cells or platelets) from a donor to a patient.</td></tr>
<tr><td>Hematopoietic Stem Cell Trans-plantation</td><td>• Also called as Bone Marrow Transplant
• Involves replacing damaged or diseased bone marrow with healthy stem cells to restore blood cell production.</td></tr>
<tr><td rowspan="7">Engineered Cell Therapies</td><td>T-cell Receptor (TCR) Therapy</td></tr>
<tr><td>Involves genetically modifying a patient's T cells (collected from the patient's blood) to express a specific T-cell receptor (proteins found on the surface of T cells) that recognizes and targets cancer cells.</td></tr>
<tr><td>Tumor-Infiltrating Lymphocyte (TIL) Therapy</td></tr>
<tr><td>• Patient's own immune cells (TILs) are extracted from their tumor, expanded in a lab, and then infused back into the body to target and destroy cancer cells.
• TILs are T cells, a type of immune cell that are naturally present within a tumor.</td></tr>
<tr><td>Natural Killer (NK) Cell Therapy</td></tr>
<tr><td>NK cells, a type of immune cell, are used to fight cancer, either by enhancing their natural abilities or by modifying them to target specific cancer cell.</td></tr>
<tr><td>Chimeric Antigen Receptor (CAR) T-cell Therapy</td></tr>
<tr><td>• Involves genetically engineering a patient's own T cells (red) and infused back in the patient's body to recognise and kill cancer cells (red and blue).
• As of today, CAR T-cell therapy has been approved for leukaemias (cancers arising from the cells that produce white blood cells) and lymphomas (arising from the lymphatic system).</td></tr>
<tr><td>Note: "Living drugs," also known as cell therapies, are treatments that use living cells, often T cells, modified in a lab and reintroduced to the patient to fight diseases, especially cancer, by targeting specific cells or pathways.</td></tr>
</table>

<table>
<tr><td rowspan="7">Antibiotic Development</td><td rowspan="2">Description</td><td>• They are group of medicines that are used to treat infections caused by bacteria and certain parasites. Antibiotics do not work against infections that are caused by viruses or fungi.
• Antibiotics work by killing bacteria (or parasites). This is often done by interfering with the structure of the cell wall of the bacterium or parasite. Some work by stopping bacteria or the parasite from multiplying.
• The first antibiotic, salvarsan, was deployed in 1910.
• Alexander Fleming discovered the penicillin in 1928.
• The first commercially available antibacterial was Prontosil, a sulfonamide developed by the German biochemist Gerhard Domagk.
• In 1945, Penicillin was introduced on a large scale as a treatment for bacterial infections.
• 1940 – 1962 known as the golden era of antibiotics.
• The antibiotic golden era was followed by a gradual decrease in the development of novel therapeutic options until 1987.
Note: B lymphocytes are a type of white blood cell that plays a central role in antibody production.</td></tr>
<tr><td rowspan="4">Classification</td><td>Penicillins: used to treat various infections, including skin, chest, and urinary tract infections</td></tr>
<tr><td>Cephalosporins: used against more serious infections like sepsis and meningitis.</td></tr>
<tr><td>Tetracyclines: used against acne and rosacea.</td></tr>
<tr><td>Macrolides: Useful against lung and chest infections, and as an alternative for people with penicillin allergies.</td></tr>
<tr><td>Fluoroquinolones: used to treat a variety of bacterial infections, including respiratory, urinary tract, and skin infections, as well as certain serious infections like anthrax and typhoid fever.</td></tr>
<tr><td>Issues</td><td>• When bacteria, viruses, fungi and parasites no longer respond to antimicrobial medicines.
• Antibiotic-resistant “superbugs” directly caused 1.14 million deaths worldwide in 2021, according to The Lancet, a medical journal.
• Surveys in Indian hospitals show that infections with drug-resistant bacteria have a 13% mortality rate</td></tr>
<tr><td rowspan="2">Xenotransplantation</td><td>Description</td><td>• Meaning: Involves the transplantation of tissue organs from a donor species into the recipient of a different species.
• Primary Aim: To address the shortage of organs for transplantation by utilizing tissue organs from animals, typically pigs which are considered suitable donors due to their physiological and anatomical similarities to humans.
• People with serious kidney, liver, or heart disease, diabetes, or Parkinson’s disease could be treated through xenotransplantation.</td></tr>
<tr><td>Challenges</td><td>• Natural killer (NK) cells play a pivotal role in the immune response to xenografts, which are transplants between different species.
➢ NK cells are part of the innate immune system, which serves as the first line of defense against invading pathogens, including xenografts.
➢ Unlike adaptive immune cells, such as T cells, NK cells do not require prior sensitization to recognize and respond to foreign entities.
➢ This innate recognition makes NK cells particularly important in the early stages of xenograft rejection.
➢ Under-standing the role of NK cells in xenograft rejection is crucial for developing strategies to mitigate their impact.
Note: T cells play a crucial role in mediating xenograft rejection, which is primarily a cell-mediated immune response.</td></tr>
</table>

3D printing or Lab Grown Organs and Bones	***Description***	• These organs are functional, biological replicas of naturally occurring body parts. • It allows living cells and biomaterials to be 'printed' layer by layer to mimic cell architecture in the body. • The current success rate for 3D printing in labs is still in its early stages and not fully developed. *Note: Bioinks may be made from natural or synthetic biomaterials alone, or a combination of the two as hybrid materials. The main element of bio ink is cells with other materials components such as hydrogels or microgels.*
Vaccine Development	***Inactivated vaccines***	• Use the killed version of the germ that causes a disease. Inactivated vaccines usually don't provide immunity (protection) that's as strong as live vaccines. • Used to protect against: Hepatitis A; Flu (shot only); Polio (shot only); Rabies.
	Live-Attenuated vaccines:	• Use a weakened (or attenuated) form of the germ that causes a disease. • They create a strong and long-lasting immune response. • Used to protect against: Measles, mumps, rubella (MMR combined vaccine); Rotavirus; Smallpox; Chickenpox; Yellow fever.
	Subunit, Recombinant, Polysaccharide, and Conjugate Vaccines	• Use specific pieces of the germ—like its protein, sugar, or capsid (a casing around the germ). • Because these vaccines use only specific pieces of the germ, they give a very strong immune response that's targeted to key parts of the germ. • Used to protect against: Hib (Haemophilus influenzae type b) disease; Hepatitis B; HPV (Human papillomavirus); Whooping cough (part of the DTaP combined vaccine); Pneumococcal disease; Meningococcal disease; Shingles.
	Toxoid Vaccines	• Use a toxin (harmful product) made by the germ that causes a disease. • They create immunity to the parts of the germ that cause a disease instead of the germ itself. • Used to protect against: Diphtheria; Tetanus.
	Viral Vector Vaccines	• Use a harmless virus to deliver to the hosts cells the genetic code of the antigen you want the immune system to fight. • They are basically a gene delivery system. • These usually trigger a strong immune response. E.g. Ebola vaccine and COVID-19 vaccine.
Applications of Biotechnology in Industry		
Development of Biofuel	***Fermentation***	• Bioethanol: Microorganisms, like yeast, ferment sugars (from crops like corn or sugarcane) or starch to produce ethanol. • Biobutanol: Certain bacteria can ferment sugars into butanol, another biofuel. • Biogas: Anaerobic digestion of organic matter (like agricultural waste or sewage sludge) by microorganisms produces biogas, which can be used as fuel. ➢ Biogas contains around 50-70 percent methane, 30-40 percent carbon dioxide, and trace amounts of other gases. ➢ Compressed Biogas (CBG) has a lower calorific value compared to petrol and diesel. ➢ However, CBG and CNG (Compressed Natural Gas) have the same calorific value.
	Genetic Engineering	Creation of "cell factories" (microbes) with enhanced efficiency for biofuel production, and modifying plants to increase biomass, reduce lignin content, and improve biofuel yields.
	Metabolic Engineering	Modifying the genetic makeup and metabolic pathways of microorganisms (like bacteria, yeast, or algae) to enhance the production of biofuels.

<table>
<tr><td rowspan="3">Development of Biological Fuel Cells</td><td rowspan="2">Microbial Fuel Cells (MFCs)</td><td>Description</td><td>Non-combustive devices providing electrical energy using microorganisms as biocatalysts and organic materials as substrate.</td></tr>
<tr><td>Working</td><td>• Biofilm forms on the surface of the anode chamber and provides direct electron transfer by conductance to the anode.
• MFCs are inexpensive to construct because they depend on materials produced in abundance and conventionally regarded as waste.
• Potential: Waste treatment and clean energy production</td></tr>
<tr><td>Enzymatic Biofuel</td><td colspan="2">Uses enzymes as catalysts to convert chemical energy from biofuels into electricity, offering potential for powering implantable devices and biosensor.</td></tr>
<tr><td colspan="4">Application in Agriculture and Allied Activities</td></tr>
<tr><td>Cultured meat' or 'Cultivated Meat'</td><td colspan="3">• Made in laboratories, using cells from living animals or fertilized egg. Benefits are:
• Production process consumes far less energy, land, and water.
• Produced in a highly controlled environment which can protect the meat from microbes and contamination.
• Currently, the Food Safety and Standards Authority of India (FSSAI) has classified cultivated meat as a "Novel Food".
Note: Novel Food is defined as food that had not been consumed to a significant degree by humans.</td></tr>
<tr><td>Genetically modified (GM) Crops</td><td colspan="3">• Developed by introducing specific DNA sequences into a plant's genome to confer desired traits, like drought resistance, using techniques like recombinant DNA technology or direct gene transfer.
• Genetic Engineering Appraisal Committee (GEAC), under MoEF&CC, the apex technical body charged with evaluating proposals for testing genetically modified (GM) seeds in India.
Note:
• Cotton remains the only transgenic crop that is being commercially cultivated in India.
• Recombinant DNA Technology: Combining DNA from different sources to create new genetic combinations, which are then inserted into a host organism.</td></tr>
<tr><td>Transgenic Foods</td><td colspan="3">• Also known as genetically modified or bioengineered foods, are produced from organisms whose DNA has been altered using genetic engineering techniques.
• Used to introduce specific traits, including nutritional enhancements, but can also target other characteristics like pest resistance or herbicide tolerance.</td></tr>
<tr><td>Biofortification</td><td colspan="3">• Process by which the nutrient density of food crops is increased through
➢ Conventional plant breeding
➢ Improved agronomic practices
➢ Modern biotechnology
➢ without sacrificing any characteristic.
• It differs from fortification because it aims to make plant foods naturally more nutritive rather than adding nutrient supplements to the foods.</td></tr>
<tr><td>Space-Resilient Crops</td><td colspan="3">ISRO, through its CROPS (Compact Research Module for Orbital Plant Studies) mission, has developed space-resilient crops by successfully germinating cowpea seeds in microgravity.</td></tr>
<tr><td colspan="4">India's Biotechnology Sector</td></tr>
<tr><td>Facts and Data</td><td colspan="3">• Growth and Projections: From a $10 billion industry in 2014 to over $130 billion in 2024, with projections to reach $300 billion by 2030.
• Contributes 4.25% to GDP with a compound annual growth rate (CAGR) of 17.9% over the past four years.
• India currently accounts for 60% of global vaccine production
• India is home to the second-largest number of USFDA-approved manufacturing plants outside the United States.</td></tr>
</table>

Key Achievements in 2024	• Development of the world's first human papillomavirus (HPV) vaccine, Cervavac. • Creation of the indigenous antibiotic 'Nafithromycin,' which has proven effective in treating respiratory diseases. • Successfully development of a gene therapy experiment for Haemophilia.	
Agricultural Biotechnology in India	***Climate-Smart Crops***	A drought-tolerant, high-yielding chickpea variety SAATVIK (NC 9) has been approved for cultivation.
	Genome-Edited Rice	Loss-of-function mutations in yield-limiting genes have led to improved rice lines like DEP1-edited MTU-1010, showing higher yields.
	Genotyping Arrays	India's first 90K SNP arrays—IndRA for rice and IndCA for chickpea—enable DNA fingerprinting and variety identification.
	Amaranth Resources	A genomic database, NIRS techniques, and a 64K SNP chip aid nutritional screening and development of anti-obesity amaranth varieties.
	Biocontrol	A nano-formulation from Myrothecium verrucaria offers eco-friendly control of powdery mildew in tomato and grape.
	Kisan-Kavach	An anti-pesticide protective suit enhances farmer safety from toxic exposure.
Biotechnology Industry Research Assistance Council (BIRAC)	• Not-for-profit Section 8, Schedule B, Public Sector Enterprise. • Set up by the Department of Biotechnology (DBT), Government of India, as an Interface Agency. • Aims to strengthen and empower the emerging Biotech enterprise.	

Ecosystem

<table>
<tr><td>Definition</td><td colspan="3">• It is a functional unit of nature, where living organisms interact among themselves and also with the surrounding physical environment.
• Eco: Eco means environment.
• System: consists of a set of independent parts or subsystems that function as a unit.
• The system works with an input resource like Sun's Energy.</td></tr>
<tr><td rowspan="5">Components</td><td rowspan="3">Abiotic</td><td colspan="2">These are non-living components, grouped into three categories.</td></tr>
<tr><td>Physical Factors</td><td>• Sustain and limit the growth of organisms in an ecosystem.
• Example: Temperature, Humidity, Sunlight and Pressure.</td></tr>
<tr><td>Inorganic Factors</td><td>• These are non-living.
• Example: Carbon dioxide, nitrogen, oxygen, Soil, Minerals, Water and other minerals.</td></tr>
<tr><td>Organic compounds</td><td>• Building blocks of living systems
• Example: Carbohydrates, proteins, lipids</td></tr>
<tr><td rowspan="4">Biotic</td><td colspan="2">• Consists of all the living organisms of an ecosystems (terrestrial or Aquatic) or those who move from one ecosystem to the other.
• Biotic components are dependent on the abiotic factors like Light and heat energy.</td></tr>
<tr><td>Producers</td><td>• Autotrophs produce food for the entire ecosystem through the process of photosynthesis.
• They are the highest in number.
• Example: green plants</td></tr>
<tr><td>Consumers</td><td>• Consume food synthesized by the Producers
Example
• Herbivores: Plant eaters
• Carnivores: animal eaters
• Omnivores: Eat both plant and animals</td></tr>
<tr><td>Decomposers</td><td>• Saprotrophs, feed on dead and decaying matter.
• Secrets enzymes outside their body on the decaying matter.
• They play a very important role in recycling of nutrients.
• They are also called detrivores or detritus feeders.
• Example: Fungi and Bacteria</td></tr>
<tr><td colspan="4">Functions of Ecosystem</td></tr>
<tr><td rowspan="4">Productivity</td><td colspan="3">The rate of biomass production is called productivity. It is furtther divided into Primary and secondary productivity.</td></tr>
<tr><td>Primary</td><td colspan="2">• It is defined as the rate of biomass production.
• The biomass/organic matter produced per unit area over a time period by plants during photosynthesis.
• It depends on Plant species, environmental factors, nutrients, type of ecosystem and photosynthetic capacity of plants.
• Expressed as Weight (gm^{-2}) or energy ($kcal\ m^{-2}$)</td></tr>
<tr><td>Gross and Net Primary</td><td colspan="2">• GPP is the rate of production of organic matter during photosynthesis.
• Some amount of GPP is utilised by plants in respiration.
• Gross primary productivity minus respiration losses (R), is the net primary productivity (NPP).
• GPP − R = NPP
• Net Primary Productivity of Oceans is less than Continents</td></tr>
<tr><td>Secondary</td><td colspan="2">It is the rate of formation of new organic matter by consumers.</td></tr>
</table>

<table>
<tr><td rowspan="6">Decomposition</td><td colspan="2">It is breaking down of complex organic matter into inorganic substances like carbon dioxide, water and nutrients.
Raw Material:
Dead leaves, bark, flowers, fecal matter (detritus) and animal bodies.
Steps:
• Fragmentation → Leaching → Catabolism → Humification → Mineralization.
• Decomposition is largely an oxygen-requiring process.
• Rate of decomposition is controlled by chemical composition of detritus and climatic factors.
• Warm and moist environment favour decomposition.
• Low temperature hinders decomposition resulting in buildup of organic materials.</td></tr>
<tr><td>Fragmentation</td><td>Breaking down of detritus into smaller particles. It is done by detritivores.</td></tr>
<tr><td>Leaching</td><td>Leaching allows water-soluble inorganic nutrients to go down into the soil horizon and get precipitated as unavailable salts.</td></tr>
<tr><td>Catabolism</td><td>Degrading detritus into simpler inorganic substances by bacteria and fungi.</td></tr>
<tr><td>Humification</td><td>• Accumulation of a dark-coloured amorphous substance called humus.
• Humus is highly resistant to microbial action and undergoes decomposition at an extremely slow rate.
• Humus is reservoir of nutrients.</td></tr>
<tr><td>Mineralization</td><td>Breaking down of humus into inorganic nutrients by microbes.</td></tr>
<tr><td rowspan="3">Energy Flow</td><td>Source</td><td>• Sun is the only source of energy for all ecosystems on Earth except for deep sea hydro-thermal ecosystems.
• Solar energy captured by plants flows through food chains in an ecosystem.
• Green plants in a terrestrial ecosystem capture about 1% of the energy of sunlight</td></tr>
<tr><td>Food Chain</td><td>• Transfers matter and energy in the form of food from organism to organism.
Example: Grass → Goat → Man
• The energy trapped by the producer is either passed on to a consumer or the organism dies. Thus, no energy that is trapped into an organism remains in it for ever.
• An average of 10% of the food eaten is turned into its own body and made available for the next level of consumers.
• The flow of energy is unidirectional, diminishing progressively due to loss of energy at each level</td></tr>
<tr><td>Types of Food Chains</td><td>Grazing Food Chain:
• In this type of food chain the primary consumers, are herbivores and use the plant or plant part as their food. This food chain begins from green plants.
• Grass → Grasshopper → Frog → Snake → Eagle
Detritus Food Chain:
• It starts from dead organic matter of decaying and metabolic wastes of animals and plant bodies called detritus to the micro-organisms which are primary detritus feeding organism called detrivores or decomposer then to secondary detritus feeders and finally to herbivore and then to predators. The energy contained in detritus, serves as a source of energy in this food chain.
• Detritus → Primary feeder → SecondaryFeeder
Parasitic Food Chain:
• It starts with green plants, then goes to the plant or the herbivores on which the parasitic organisms feed. This parasitic food chain ends with parasitic organisms which unlike predators do not kill the host.
• Zebra → Nematode → Saprophytic bacteria</td></tr>
</table>

<table>
<tr><td rowspan="2">Energy Flow</td><td>Food Web</td><td colspan="2">• The length and complexity of food chains vary greatly. Each organism is generally eaten by two or more other kinds of organisms which in turn are eaten by several other organism.</td></tr>
<tr><td>Energy Cycle</td><td colspan="2">• Death of organism is the beginning of the detritus food chain/web.
• Detritus food chain (DFC) is made up of decomposers mainly fungi and bacteria.
• Decomposers meet their energy and nutrient requirements by degrading dead organic matter or detritus. These are also known as saprotrophs.
• They secrete digestive enzymes that breakdown dead and waste materials into simple, inorganic materials.</td></tr>
<tr><td>Biomagnification</td><td colspan="3">• Harmful chemicals entering human bodies through the food chain.
• Pesticides and insecticides used in agriculture are either washed down into the soil or into the water bodies later absorbed by the terrestrial plants or aquatic plants and animals.
• The non degradable nature of chemicals leads to accumulation progressively at each trophic level.
• Human beings occupying the top level in any food chain, are susceptible to maximum concentration of these chemicals, known as biological magnification.</td></tr>
<tr><td>Biomagnification</td><td>Trophic levels</td><td colspan="2">• Based on the source of the food, organisms occupy a specific place in the food chain that is known as their trophic level.
➢ First level: Producers
➢ Second Level: Herbivores (primary consumer)
➢ Third Level: Carnivores (secondary consumer).
➢ Fourth Level: Heterotrophs/Carnivores (Tertiary Consumers)
➢ Fifth Level: Heterotrophs/Top carnivores (quarternary consumers)
• The amount of energy decreases at successive trophic levels.
• Each trophic level has a certain mass of living material at a particular time called as the standing crop.
• It is measured as the mass of living organisms (biomass) or the number in a unit area.</td></tr>
<tr><td rowspan="4">Ecological Pyramid</td><td colspan="3">• Ecological pyramids are the graphic representations of trophic levels in an ecosystem.
• The producers make the base of the pyramid and the subsequent tiers of the pyramid represent herbivore, carnivore and top carnivore levels.</td></tr>
<tr><td rowspan="3">Types</td><td>Pyramid of number</td><td>• It is the total number of individual organisms at each level in the food chain of an ecosystem.
• Example in a grassland the number of grasses is more than the number of herbivores that feed on them and the number of herbivores is more than the number of carnivores.</td></tr>
<tr><td>Pyramid of biomass</td><td>• It is the total standing crop biomass at each trophic level. Standing crop biomass is the amount of the living matter at any given time.</td></tr>
<tr><td>Pyramid of energy</td><td>• It is the total quantity of available energy stored in the biomass of organisms at each level in the food chain of an ecosystem per year.
• A given organism may occupy more than one trophic level in the same ecosystem at the same time; for example, a sparrow is a primary consumer when it eats seeds, fruits, peas, and a secondary consumer when it eats insects and worms.</td></tr>
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<table>
<tr><td colspan="3">

- *Note*: In most ecosystems, all the pyramids have producers more in number and biomass than the herbivores, and herbivores more in number and biomass than the carnivores.
- Energy at a lower trophic level is always more than the energy at a higher level.
- *Exception:* In case of aquatic ecosystems, phytoplankton are the main producers, they have very short life cycles therefore fishes (consumers) are more in number.

</td></tr>
<tr><td rowspan="4">Population Interactions</td><td>Mutualism</td><td>

- It confers benefits on both the interacting species.
- *Examples: Lichens (fungus) and cyanobacteria (photosynthesising algae).*
- *Mycorrhizae (fungi) and the roots of higher plants.*
- The fungi help the plant in the absorption of essential nutrients from the soil while the plant in turn provides the fungi with energy-yielding carbohydrates.
- Plant and animal relationship like the flower and its pollinator species. *Example*: Some fig species can be pollinated only by its 'partner' wasp species and no other species.
- Orchids show a diversity of floral patterns mainly evolved to attract the right pollinator insect (bees and bumblebees) to ensure guaranteed pollination. *Example: Mediterranean orchid Ophrys employs 'sexual deceit' to get pollination done by a species of bee.*

</td></tr>
<tr><td>Commensalism</td><td>

- One species benefits and the other is neither harmed nor benefited.
- *Examples:*
- An orchid growing as an epiphyte on a mango branch.
- Barnacles growing on the back of a whale.
- Cattle egret and grazing cattle.
- Sea anemone and the clown fish

</td></tr>
<tr><td>Parasitism</td><td>

- One species is harmed and the other benefits.
- Some parasites are host-specific that both host and the parasite tend to co-evolve. (If the host evolves new mechanisms for rejecting or resisting the parasite, the parasite too evolves mechanisms to counteract and neutralize them, in order to be successful with the same host species).
- Majority of the parasites harm the host; they may reduce the survival, growth and reproduction of the host and reduce its population density.
- Example:
- Humans;
- Lice on humans and ticks on dogs. Feeding on external surface of the host.
- The human liver fluke (a trematode parasite) depends on two intermediate hosts (a snail and a fish) to complete its life cycle.
- Plants;
- Cuscuta, a parasitic plant found growing on hedge plants, has lost its chlorophyll and leaves in the course of evolution and derives nutrition from the host plant.
- Birds;
- Brood parasitism in birds where the parasitic bird lays its eggs in the nest of its host and lets the host to incubate them.

</td></tr>
<tr><td>Competition</td><td>

- Closely related species competing for same set of limited resources.
- Defined as fitness of one species (measured in terms of its 'r' the intrinsic rate of increase) is significantly lower in the presence of another species.
- Probable elimination of inferior species by superior species.

Example:

- The Abingdon tortoise in Galapagos Islands became extinct within a decade after goats were introduced on the island, apparently due to the greater browsing efficiency of the goats.
- Competitive release of a species whose distribution is restricted to a small geographical area because of the presence of a competitively superior species, is found to expand its distributional range dramatically when the competing species is experimentally removed.

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Population Interactions	***Predation***	• Predator captures kills and eats prey of another species. • The predator naturally benefits from this relationship. • For plants, herbivores are the predators. • Predation is used as biological control methods. • *Example*: A cactus-feeding predator (a moth) from its natural habitat was introduced into Australia prickly pear cactus caused havoc by spreading rapidly into millions of hectares of rangeland.

Population Interaction	**Interaction**	**Species B**
Beneficial Interaction: (+) *Detrimental:* (-) *Neutral:* (0)	Mutualism	+
	Predation	-
	Parasitism	-
	Commensalism	-
	Amensalism	**0**
	Competition	-

The Gupta Period

<table>
<tr><td>Background</td><td colspan="2">

The empires of the Satavahanas and Kushanas came to an end in the middle of the third century A.D. and a new dynasty emerged in north India, known as the Guptas.
About the early Guptas we do not know much in detail.

The Allahabad pillar inscription of Samudragupta mentions maharaja Srigupta and maharaja Gh totkacha as his ancestors.
I-tsing, who travelled India from A.D. 671 to 695 refers to Srigupta as the builder of a temple at Gaya for the Chinese pilgrims
This king Srigupta has been identified with the first Gupta king of that name mentioned in the Allahabad pillar inscription.
Srigupta was succeeded by his son Ghatotkacha who too is referred to as ‘ raja in Gupta records.

The Guptas established their rule over Anuganga (along the Ganges in the mid-Gangetic basin), Prayag (modern Allahabad), Saketa (modern Ayodhya), and Magadha.

In the course of time, this kingdom became an all-India empire

</td></tr>
<tr><td rowspan="2">Important Rulers</td><td>Chandragupta I(A.D. 320-34)</td><td>

He was the first important king of the Gupta dynasty.
He succeeded his father Ghatotkacha.
Chandragupta I married a Lichchhavi princess Kumaradevi.

This marriage alliance of Chandragupta I was important for his political career as is proved by the coins of Chandragupta I and Kumaradevi type.

These coins portray the figures of Chandragupta and Kumaradevi and mention the name of the Lichchhavis.

Samudragupta, son of Chandragupta I and Kumaradevi, in the Allahabad inscription called himself Lichchhavis-dauhitra ‘son of the daughter of Lichchhavis’.

Introduced a new era, the Gupta era, starting with his coronation in A.D. 320.
First Gupta king to adopt the title maharajadhiraja and issue gold coins.

</td></tr>
<tr><td>Samudragupta (AD 335–80)</td><td>

The Allahabad pillar inscription gives a detailed account of the career and personality of Samudragupta.

The inscription was composed by one of his officials, Harishena, and engraved on the Ashoka’s pillar at Allahabad.
The inscription enumerates the peoples and countries that were conquered by Samudragupta.
In the aryavarta he uprooted nine kings and princes and annexed their kingdom.
His next important campaign was in southern India.
Altogether twelve kings and princes of the south (dakshinapatha) are listed in the inscription.
It also lists fourteen kingdoms bordering his kingdom.

The rulers paid tribute, followed his orders and showed their obedience by attending his court.

These were located in eastern Rajasthan, northern Madhya Pradesh, Assam and Nepal.

</td></tr>
</table>

Important Rulers	***Chandragupta II (AD 380-412)***	• The reign of Chandragupta II saw the high watermark of the Gupta empire, both in terms of territorial expansion and cultural excellence. ➢ He is the son of Samudragupta and Dattadevi. ➢ The exploits of a king called Chandra are glorified in an iron pillar inscription fixed near Qutb Minar in Delhi(erected originally in front of a temple of Vishnu). o If Chandra corresponds to Chandragupta II, it would appear that he established Gupta authority in north-western India and in a substantial part of Bengal. ➢ Adopted the title of Vikramaditya, which had been first used by an Ujjain ruler in 58–57 BC ➢ Issued dated silver coins to commemorate his victory over Saka Kshatrapas. o This Ujjain ruler is traditionally called Shakari or the enemy of the Shakas. o The Vikrama samvat or era was started in 58– 57 BC by Shakari. ➢ The court of Chandragupta II at Ujjain was adorned by numerous scholars including Kalidasa and Amarasimha. ➢ During his reign the Chinese pilgrim Fa-hien (AD 399–414) visited India and wrote an elaborate account of the life of its people. o He described the country as a happy and prosperous one.
	Kumaragupta I (A.D. 413-455)	• He issued Ashvamedha type of coins. ➢ Organised the administration of the vast empire and maintained its peace, prosperity and security for a long period of forty years. ➢ Empire was challenged by the Pushyamitras, a community living on the banks of the Narmada. o Skandagupta, son of Kumaragupta I fought and subdued them and restored peace.
	Skandagupta (A.D. 455-467)	• Kumaragupta I died in and was succeeded by his son Skandagupta. ➢ Hunas, a ferocious barbarian horde which lived in central Asia and were threatening the mighty Roman empire in the west. ➢ Crossed the Hindu Kush, occupied Gandhara and defied the Gupta empire. ➢ Skandagupta inflicted a terrible defeat upon the Hunas. ➢ Another important event of Skandagupta's reign is the restoration and repair of the dam on Sudarsana lake ➢ It had been built during Chandragupta Maurya's reign. ➢ This lake was previously repaired during the reign of Saka kshatrapa Rudradaman I.
	Decline	• The Gupta dynasty continued to be in existence for more than 100 years after the death of Skandagupta in A.D. 467. ➢ The Hunas again attacked under the leadership of Toramana in A.D. 512. o They conquered a large part of north India upto Gwalior and Malwa. o Toramana was succeeded by his son Mihirakula who established his capital at Sakala (Sialkot). ➢ Hiuen-Tsang describes how Mihirkula(Toramana's son) invaded Magadha and was defeated by the Gupta king Baladitya. ➢ According to an inscription from Malwa, Yasovarman, also defeated Mihirakula.
Aspects of Gupta Period		
Polity and Administration	***King***	• Adopted pompous titles such as parameshvara, maharajadhiraja, and paramabhattaraka which signify that they ruled over many lesser kings in their empire.
	Military	• Horse archery became an important element in military tactics.

Polity and Administration	***Taxes***	• During the Gupta period land taxes increased in number, and those on trade and commerce decreased. • In addition, whenever the royal army passed through the countryside, the local people had to feed it. • Peasants had also to supply animals, food grains, furniture, etc., for the maintenance of royal officers on duty in rural areas. • In central and western India, the villagers were also subjected to forced labour called vishti by the royal army and officials.
	Judiciary	• Several law-books were compiled during this period, and for the first time civil and criminal laws were clearly demarcated. • Theft and adultery fell under criminal law, disputes regarding various types of property under civil law. • Laws about inheritance. ➢ The Brihaspatismriti enumerates eighteen titles of land ➢ Fourteen of these have their origin in property (dhanamula) and four in injury (himsamula). o Detailed laws about private properties land partition, sale, mortgage and lease of land in law-books and in inscriptions of the period. ➢ Many laws continued to be based on varna differentiation. o It was the duty of the king to uphold the law, and try cases with the help of brahmana priests. ➢ Guilds of artisans, merchants, and others were governed by their own laws. o Seals from Vaishali and from Bhita indicate that these guilds flourished during Gupta times.
	Bureaucracy and Administration	• Two new classes of officers introduced by the Guptas were ➢ Sandhivigrahika - the minister of peace and war, and ➢ Kumaramatyas - a body of top ranking officials • The empire was divided into divisions called bhuktis, and each bhukti was placed under the charge of an uparika. • The bhuktis were divided into districts (vishayas), which were placed under the charge of a vishayapati. • Vishayapatis had their headquarters in towns. • They had their own officers and were aided in their administrative work by a Board of Advisors(this body was known as Adhisthanadhikarana) consisting of four members ➢ nagarsresthis (chief of the guild of traders and bankers) represented the guilds. ➢ sarthavaha (the head of guild of traders) represented the various trading communities, ➢ prathamakuUka (the chief of artisan) representing various artisan classes, ➢ prathamakayastha (the chief scribe). • In eastern India, the vishayas were divided into vithis, which again were subdivided into villages. • The village headman gained importance in Gupta times, managing village affairs with the assistance of elders. • No land transactions could be effected without their consent. • The system of administration described above applied to areas which were ruled directly by the officers appointed by the Gupta kings. ➢ The major part of the empire was held by feudatory chiefs, many of whom had been subjugated by Samudragupta.

<table>
<tr><td rowspan="2">Polity and Administration</td><td>Bureaucracy and Administration</td><td>
• Feudal System: Guptas granted fiscal and administrative concessions to priests and administrators.
➢ Started in the Deccan by the Satavahanas, the practice became a regular affair in Gupta times, particularly in MP.
➢ Religious functionaries were granted land, free of tax, for posterity, and they were authorized to collect from the peasants all the taxes that once went directly to the emperor.
➢ The villages granted to the beneficiaries could not be entered by royal agents, retainers, and others, and the beneficiaries were also empowered to punish criminals.
• The abundance of gold coins would suggest that higher officials continued to be paid in cash, but some of them may have been remunerated by land grants.
• As much of the imperial administration was managed by feudatories and beneficiaries, the Guptas neither needed nor had the elaborate administrative machinery of Maurya times, and in some ways their political system appears to have been feudal.
</td></tr>
<tr><td colspan="2">Fa-Hien, the Chinese traveller, informs us that Magadha was full of cities and its rich people believed in and supported it with charitable offerings.</td></tr>
<tr><td rowspan="3">Economy</td><td>Coinage</td><td>
In ancient India, the Guptas issued the largest number of gold coins, which were called dinaras in their inscriptions.
• Regular in size and weight, they appear in many types and sub-types.
➢ They vividly portray Gupta kings, indicating the latter's love for war and art.
➢ Gold content the Gupta coins are not as pure as the Kushan one.
• After the conquest of Gujarat, the Guptas issued a large number of silver coins mainly for local exchange, in which silver occupied an important position under the Western Kshatrapas.
• In contrast to those of the Kushans, the Gupta copper coins are very few in number.
➢ This would suggest that the use of money did not touch the common people as much as it did under the Kushans.
</td></tr>
<tr><td>Long-Distance Trade</td><td>
• In comparison to the earlier period we notice a decline in long-distance trade.
• Till AD 550 India carried on some trade with the eastern Roman or Byzantine empire, to which it exported silk.
• Around AD 550, the people of the eastern Roman empire learnt from the Chinese the art of growing silk, which adversely affected India's export trade.
• Even before the mid-sixth century, the demand for Indian silk abroad had slackened.
➢ In the mid-fifth century, a guild of silk weavers left their original home in western India in the state of Lata in Gujarat and migrated to Mandasor in Malwa where they abandoned their original occupation and adopted other professions.
</td></tr>
<tr><td>Land Grants</td><td>
• The striking development of the Gupta period, especially in eastern and central MP, was the emergence of priestly landlords at the cost of local peasants.
➢ In central and western India, the peasants were also subjected to forced labour.
• However, a substantial amount of virgin soil was brought under cultivation, and better knowledge applied to agriculture in the tribal areas of central India by the brahmana beneficiaries.
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</table>

Society	***Background***	• Large-scale land grants to the brahmanas suggest that the brahmana supremacy increased in Gupta times. ➢ The brahmanas accumulated wealth on account of the numerous land grants made to them and therefore claimed many privileges, which are listed in the Narada Smriti, the lawbook of Narada, a work of about the fifth century.
	Castes	• The castes proliferated into numerous sub-castes as a result of two factors. • A large number of foreigners had been assimilated into Indian society, and each group of foreigners was considered a kind of caste. ➢ The Hunas, who came to India towards the close of the fifth century, eventually came to be recognized as one of the thirty-six clans of the Rajputs-Even now some Rajputs bear the title Hun. • The absorption of many tribal people into brahmanical society through the process of land grants. ➢ The tribal chiefs were assigned a respectable origin, but most of their ordinary kinsmen were assigned a low origin, and every tribe became a kind of caste in its new incarnation.
	Shudras	• The position of shudras improved during this period. • They were now permitted to listen to recitations of the Ramayana, the Mahabharata, and the Puranas. • The shudras could also worship a new god called Krishna and were also permitted to perform certain domestic rites which naturally meant fees for the priests. • This can all be linked to some improvement in the economic status of the shudras. ➢ From the seventh century onwards, they were mainly represented as agriculturists; in the earlier period, they generally figured as servants, slaves, and agricultural labourers working for the three higher varnas.
	Chandalas	• During this period, the number of untouchables increased, especially the chandalas. ➢ The Chandalas entered the society as early as the fifth century BC. ➢ By the fifth century AD, their number had become so enormous and their disabilities so glaring that these attracted the attention of the Chinese pilgrim Fa-Hien. o He informs us that the chandalas live outside the village and deal in meat and flesh. o Whenever they enter the town, they strike a piece of wood to announce their arrival so that others may avoid them.
	Women	• In the Gupta period, like the shudras, women were also allowed to listen to the Ramayana, the Mahabharata, and the Puranas, and were advised to worship Krishna. • Women of the two lower varnas were free to earn their livelihood, which gave them considerable freedom, but this was denied to women of the upper varnas. • The first example of the immolation of a widow (sati) after the death of her husband occurred during the Gupta period in AD 510. ➢ However, some post-Gupta law-books held that a woman could remarry if her husband was dead, destroyed, impotent, had become a renouncer, or had been excommunicated.

Society	***Women***	• Katyayana, a lawmaker of the sixth century, held that a woman could sell and mortgage her immovable property along with her stridhana. ➢ This clearly implies that women received shares in landed property according to this lawmaker, but generally a daughter was not allowed to inherit landed property in the patriarchal communities of India. • Niyoga, according to which a younger brother or kinsman could marry the wife of the elder brother after the latter's death, was practised by the brahmanas and kshatriyas in Vedic times, but was not allowed to them by the law-books of Gupta and earlier times. ➢ Similarly, widow remarriage was not allowed to members of the higher orders, but the shudras could practise both niyoga or levirate and widow remarriage.
Religion	***Buddhism***	• Buddhism ceased to receive royal patronage during the Gupta period. ➢ Fahien gives the impression that this religion was flourishing, but in reality it was not as important during the Gupta period as it had been in the days of Ashoka and Kanishka. ➢ However, some stupas and viharas were constructed, and Nalanda became a centre of Buddhist education.
	Bhagavatism	• Bhagavatism or Vaishnavism overshadowed Mahayana Buddhism by Gupta times. • It preached the doctrine of incarnation, or avatar.-History was presented as a cycle of the ten incarnations of Vishnu. • Idol worship in the temples became a common feature of Hinduism from the Gupta period onwards and many festivals also began to be celebrated. ➢ Agricultural festivals observed by different classes of people were lent a religious garb and colour, and turned into useful sources of income for the priests.
	Tolerance	• The Gupta kings followed a policy of tolerance towards different religious sects. • We find no example of the persecution of the followers of Buddhism and Jainism.
Art	***Literature***	• Both Samudragupta and Chandragupta II were patrons of art and literature. ➢ Samudragupta is represented on his coins playing the lute (vina), and Chandragupta II is credited with maintaining in his court nine luminaries.
	Sculpture and Paintings	• During the Gupta period a life-size copper image of the Buddha of more than 6 feet was made. ➢ It was discovered at Sultanganj near Bhagalpur, and is now displayed in Birmingham. • Also, beautiful images of the Buddha were fashioned at Sarnath and Mathura, but the finest specimens of Buddhist art in Gupta times are the Ajanta paintings. ➢ Although these paintings covered the period from the first century BC to the seventh century AD, most of them relate to Gupta times. ➢ They depict various events in the life of Gautama Buddha and the previous Buddhas whose birth stories are related in the Jatakas. ➢ These paintings are lifelike and natural, and the brilliance of their colours has not faded even after fourteen centuries.

Art	***Idols***	• As the Guptas supported Brahmanism, images of Vishnu, Shiva, and some other Hindu gods were fashioned for the first time during their period. ➢ At many places, the entire pantheon is portrayed with the chief god at the centre surrounded by his retainers and subordinates. ➢ The leading god is represented as large in size, with his retainers and subordinate gods drawn on a smaller scale-This reflects clear social hierarchy and discrimination.
	Architecture	• The Gupta period was poor in terms of architecture. ➢ All that we find are a few temples made of brick in UP and a stone temple like Bhitargaon in Kanpur, Bhitari in Ghazipur, and the Dasavatara temple in Deogarh. ➢ These are the examples of early temple architecture. • The Buddhist university at Nalanda was set up in the fifth century, and its earliest structure, made of brick, relates to this period.
Literature and Language	The Gupta period is remarkable for the production of secular literature, which consisted of a fair degree of ornate court poetry.	
	Secular Literature	• Bhasa was an important poet in the early phase of the Gupta period and wrote thirteen plays. ➢ He wrote in Sanskrit, but his dramas also contain a substantial amount of Prakrit. ➢ He was the author of a drama called Dradiracharudatta, which was later refashioned as Mrichchhakatika or the Little Clay Cart by Shudraka. ➢ The play deals with the love affair of a poor brahmana trader with a beautiful courtesan, and is considered one of the best works of ancient drama. ➢ In his plays Bhasa uses the term yavanika for the curtain, which suggests Greek contact. • A few inscriptions of the period possess, characteristics features of Sanskrit kavya. ➢ The Allahabad pillar inscription by Harisena, Mandsor inscription composed by Vatsabhatti, Junagarh rock inscription, Mehrauli Pillar inscription, Aihole inscription by Ravikriti etc. are fine examples of literary expression.
	Religious Literature	• The two great epics, namely the Ramayana and the Mahabharata, were almost completed by the fourth century AD. • The earlier Puranas were finally compiled in Gupta times. ➢ They are full of myths, legends, sermons, etc., which were meant for the education and edification of the common people. • The period also saw the compilation of various Smritis or the lawbooks in which social and religious norms were written in verse. ➢ The phase of writing commentaries on the Smritis began after the Gupta period.
Science and Technology	***Language***	• The Gupta period also saw the development of Sanskrit grammar based on the work of Panini and Patanjali. ➢ Mention may also be made of three Shatakas of Bhartrihari-He has also been credited for writing the commentary on the Mahabhasya of Patanjali. ➢ This period is particularly memorable for the compilation of Amarakosha by Amarasimha-This lexicon is memorised by heart by the students who learn Sanskrit. • Prakrit was as much popular in this period as it was earlier. ➢ The Svetambara Jain canon was written in Ardha-Magadhi Prakrit and religious texts of the Digambara Jains of the south were written in the Maharashtri and Sauraseni Prakrits.

Science and Technology	***Language***	• The commentaries on Buddhist texts were written in Pali. ➢ The book on grammar of Pali is Katyayanaprakarna. • The well known Prakrit and Pali grammar works of the period are Prakritaprakasha written by Vararuchi and Prakritalakshana written by Chanda.
	Mathematics	• In mathematics, the period saw, in the fifth century, a work called Aryabhatiya written by Aryabhata who belonged to Pataliputra. ➢ One of the most important features of Aryabhata's mathematical system is his unique system of notation. o It is based on the decimal place-value system, unknown to other ancient people, but now in use throughout the civilized world ➢ A Gupta inscription of AD 448 from Allahabad district suggests that the decimal system was known in India at the beginning of the fifth century.
	Astronomy	• Varahamihira, who flourished in the court of Chandragupta II, has preserved in his Panchasiddhantika, written in A.D. 505, the accounts of five astronomical works which were evidently regarded as authority in his own time. • These five works or siddhantas are known as Paitamaha, Romaka, Paulisa, Vasishtha and Surya. ➢ The Surya Siddhanta is the most important and complete work on astronomy of the period. ➢ In the field of astrology, we are also much indebted to Varahamihira. ➢ He has, in his encyclopedic work Brihatsamhita, preserved a considerable amount of ancient knowledge on the subject. • As in mathematics, and so too in astronomy, Aryabhata was an outstanding scholar of the Gupta age. ➢ His most original contribution was that the eclipses were not the work of Rahu, as believed by some astrologers, but caused by the shadow of the earth falling on the moon, therefore, asserting the movement of earth on its own axis around the sun, as was known in Vedic times. ➢ Aryabhata was the first to utilize sign functions in astronomy. ➢ He discovered an accurate formula to measure the decrease or increase in the duration of two consecutive days.
	Metallurgy	• Bronze images of the Buddha began to be produced on a considerable scale because of the knowledge the smiths had of advanced metal technology. • With regard to iron objects, the best example is the iron pillar found at Mehrauli in Delhi. ➢ Manufactured in the fourth century AD, the pillar has not gathered any rust over the subsequent fifteen centuries which is a great tribute to the technological skill of the craftsmen, although the arid conditions in Delhi may also have contributed to its preservation. ➢ It was impossible to produce such a pillar in any iron foundry in the West until about a century ago.

Eastern India During Gupta Period

- Virtually no written records have been found in the greater portions of eastern MP and the adjoining areas of Orissa, West Bengal, Bangladesh, and Assam that relate to a period prior to the mid-fourth century AD.
- The period from the fourth to the seventh century is remarkable for the diffusion of an advanced rural economy, formation of state systems, and delineation of social classes in eastern MP, Orissa, eastern Bengal, southeast Bengal, and Assam.
  - ➢ This is indicated by the distribution of a substantial number of Sanskrit inscriptions in these areas in Gupta times.

National Income Accounting (NIA)

Meaning	Aggregate value of all the final goods and services produced in a country in a particular period of time.		
Book Keeping	• Process of recording and organizing a business's financial transactions. • Double-entry Book Keeping used in NIA records both sides of a financial transaction. • E.g.: A purchase of $100 made with a credit card, $100 is added to the expense account and $100 is subtracted from the cash account.		
Concepts	**Goods and Services**	**Goods**	*Final Goods:* Ready to be sold finally to the consumers for final use, once it has been sold it passes out of the active economic flow. It will not undergo any further transformation at the hands of any producer.
			Intermediate Goods: Goods re-processed and used by enterprises to produce the final goods.
			Durable Goods: Not extinguished by immediate or even short period consumption e.g. TV, Computer, etc.
			Consumption Goods: Food, Clothing, recreational services.
		Services	Services or tertiary activities means maintenance and repairs, training, or consulting, etc.
	Variables	**Stocks**	Variables at a particular point of time.
		Flow	Variables defined over a period of time.
	Domestic/ Economic Territory	• Geographical territory administered by the Government of India within which the person, goods, and capital can circulate freely. • Foreign embassies located in India are NOT but the Indian embassies located abroad are a part of domestic/economic territory.	
	Indirect Taxes	Indirect taxes accrue to the government hence, we have to deduct them from the market prices.	
	Subsidies	Subsidies granted by the government on the prices of some commodities hence, we need to add subsidies to market prices.	
	Market Price (MP)	• Price that a consumer pays for the product while purchasing it from the seller. • MP= Cost of Production + indirect taxes – subsidies received.	
	Factor Cost (FC)	• The cost of factors of production that are incurred by a firm when producing goods and services. • Factor Cost (FC) = Market Price – Indirect Taxes + Subsidy.	
	Nominal Price and Base Price	• Nominal price = Current Prices/ Market Price = Base Price + Inflation • Base Price is the Price of commodities in a particular past stable year.	
	Depreciation	Refers to the loss in value of fixed assets (Consumption of Capital) due to wear and tear, accidental damages, and obsolescence.	
	Net Factor Income from Abroad	• The difference between factor income earned by normal residents of India temporarily residing abroad and factor income earned by non-residents temporarily residing in India. • NFIA = Factor Income from Abroad to India – Factor Income from India to Abroad.	
	Transfer Payments	• Transfer Payments refer to those unilateral payments with no exchange of goods or services. E.g.: grants, gifts, donations, etc. • Transfer payments are not included in National Income (NI).	

<table>
<tr><td rowspan="6">Concepts</td><td>ICOR</td><td colspan="2">• Incremental Capital Output Ratio (ICOR) refers to the additional unit of capital needed to produce an additional unit of output.
• ICOR = Incremental Capital/Incremental Output.</td></tr>
<tr><td rowspan="5">Circular flow of Income</td><td colspan="2">Definition: The model depicts how money and goods & services flow in the opposite direction but move in a closed circuit.</td></tr>
<tr><td colspan="2">Production: Labour and wages, Capital and Interest, Land and rent, Entrepreneurship and profit.</td></tr>
<tr><td colspan="2">Consumption: Household expenses, Government and Private consumption.</td></tr>
<tr><td colspan="2">Investment: Households, Individuals, Government, and Private Investment.</td></tr>
<tr><td colspan="2">Net Investment = Gross investment – Depreciation.</td></tr>
<tr><td rowspan="10">Measures of National Income</td><td>Gross Domestic Product</td><td colspan="2">• GDP measures the aggregate value of final goods and services produced within the domestic economy during a year.
➢ Final Goods and Services: Only the final, (not the intermediate), goods and services.
➢ Within the Domestic Economy: Production by resident citizens as well as foreign nationals who reside in India's Economic territory.
• GDP at Market Price:
➢ GDPMP includes indirect taxes but excludes subsidies.
• GDP at Factor Cost:
➢ GDPFC = GDPMP – Indirect Taxes + Subsidies
• GDP Deflator: Ratio of Nominal GDP/Real GDP
• Real GDP
➢ GDP at Constant Price.
• Nominal GDP
➢ GDP at Current Price or Market Prices including inflation.</td></tr>
<tr><td rowspan="3">Gross National Product</td><td colspan="2">GNP measures the total value of all the final Goods and services produced in a given period by citizens of country.
• Country's Citizens: The produce of resident as well as non-resident citizens.
• The produce of foreign nationals who reside within that geographical boundary of the country is NOT considered.
• GNP = GDP + NFIA (Factor Income from Abroad to India – Factor Income from India to Abroad).</td></tr>
<tr><td>GDP</td><td>• GDP defines the economy in terms of territory.
• Measures the aggregate production.
• Wages of a citizen of Nepal working in India (Part of India's GDP).</td></tr>
<tr><td>GNP</td><td>• GNP defines it in terms of citizens.
• GNP measures the total value.
• The profits earned by the Korean-owned Hyundai car factory will be subtracted from the GDP of India but calculated in GNP.</td></tr>
<tr><td rowspan="3">Gross Value Addition</td><td colspan="2">• The value of output less the value of intermediate consumption.
• Measures the contribution of labour and capital to the production process.
• GVA = GDP – Indirect Taxes + Subsidies</td></tr>
<tr><td>GVA</td><td>• Value of all the goods and services produced within a country after deducting the value of intermediate goods and services.
• Input or supplier side view of Economy.</td></tr>
<tr><td>GDP</td><td>• Market value of all the final goods and services produced within the country.
• Output or consumer side view of economy.</td></tr>
</table>

<table>
<tr><td rowspan="6">Measures of National Income</td><td rowspan="3">Net National Income</td><td colspan="2">• Net = Gross – Depreciation
• Net Domestic Product NDP = GDP – Depreciation
• Net National Product NNP = GNP – Depreciation</td></tr>
<tr><td colspan="2">• Factor Cost = Market Price – Net Indirect Taxes
• Net Indirect taxes = Indirect taxes – Subsidies
• NNP at factor cost ≡ National Income (NI) ≡ NNP at market prices – Net indirect taxes.</td></tr>
<tr><td colspan="2">Formulas To Remember:
• GDP at Market Price = C + I + G + (X – M)
• GDP at Factor Cost = GDP at MP – NIT
• NDP = NDP at MP – Net Product Taxes – Net Production Taxes.
• GNP at MP = GDP at MP + NFIA
• GNP at FC = GNP at MP – Net Product Taxes – Net Production Taxes
• NNP at MP = GNP at MP - Depreciation
• NNP at MP = NDP at MP + NFIA
• GVA at Basic Price = GVA at MP – Net Product Taxes
• GVA at Factor Price = GVA at Basic Price – Net Production Taxes</td></tr>
<tr><td>Externalities:</td><td colspan="2">Externalities do not have any market in which they can be bought and sold. E.g.: The amount of harm to environment like loss of fisheries due to pollutants released by oil refineries or oil spill.</td></tr>
<tr><td rowspan="3">Methods of GDP Calculation</td><td>Production/ Value addition method</td><td>• NI= No. of goods sold in a year + (Opening stock – Closing Stock)
• GVA= Gross value of the output produced – Value of intermediate goods used in a year.</td></tr>
<tr><td>Expenditure Method</td><td>National Income (NI) = Personal Consumption Expenditure (C) + Investments (I) + Government Expenditure (G) + Exports (X) – Imports (I)</td></tr>
<tr><td>Income Method</td><td>National Income (NI) = Employee compensation + Corporate profits + Proprietors' Income + Rental income + Net Interest</td></tr>
<tr><td rowspan="2">Shortcomings of GDP</td><td colspan="3">• It fails to measure the inequality status of a nation.
• It does not count non-market transactions, E.g.: volunteer work.
• Black markets and illegal activities distort the values of GDP.
• Undeveloped areas still rely on barter trade.</td></tr>
<tr><td colspan="3">• It does not count the loss to the environment.
• Does not measure the actual well-being of a nation.
• It does not measure the Happiness Level of a nation
• Gender disparities are not indicated in the data of GDP.
• Condition of poor and poverty is not indicated.</td></tr>
<tr><td rowspan="2">Alternatives to GDP</td><td colspan="3">• Genuine Progress Indicator.
• Gross National Happiness = Socio-eco development, good governance, Environmental Protection and Cultural Promotion.
• Gross Sustainable Development Product.</td></tr>
<tr><td colspan="3">• Human Development Index = Health, Education and Standard of Life.
• Social Progress Index.
• Human Capital Index.
• Green GDP = GDP-Value of environmental degradation.</td></tr>
</table>

<table>
<tr><td>New GDP Series by MoSPI Post 2019</td><td colspan="2">Major Changes:
• Change in Base Year changed from 2004-05 to 2011-12.
• Factor Costs Replaced with Market Prices for calculating GDP.
• Widening of Data Pool new database with five lakh companies registered with Ministry of Corporate Affairs (MCA21).
• India's GDP growth rate for the financial year 2013-14 was 4.7% as per the old methodology, and 6.9% as per the new methodology.
• 2014 to 2024: In 10 years, India has moved from the 10th largest economy of the world to the 5th largest economy of the world.</td></tr>
<tr><td rowspan="4">National Statistical System of India</td><td colspan="2">Ministry of Statistics and Programme Implementation- Nodal Ministry</td></tr>
<tr><td>National Statistical Office (NSO) - Statistical Wing</td><td>NSO = Central Statistical Office + National Sample Survey Office merged on Rangarajan Commission recommendations.
It releases:
• Index of Industrial Production.
• Annual Survey of Industries (ASI).
• All India Economic Census.
• All India Sample Survey for Employment, Housing, Household expenditure, Consumption, etc.</td></tr>
<tr><td>Programme Implementation Wing- Three Divisions</td><td>• Twenty Point Programme.
• Infrastructure Monitoring and Project Monitoring.
• Member of Parliament Local Area Development Scheme (MPLADS).</td></tr>
<tr><td>National Statistical Office</td><td>• Composition: One Part-time Chairman and 4 part time members.
• CEO of NITI Aayog Ex-officio member of NSC.
• Chief Statistician of India is secretary to NSC and Secretary of MoSPI.</td></tr>
<tr><td>2024 Updates</td><td colspan="2">• "By the end of this century, India will not only surpass China, but will be 100 per cent bigger in terms of GDP": US-India Strategic Partnership Forum.
• World Bank's India Development Update, India's GDP is projected to grow at a robust 7% in FY 2024-25.
• India's Q2 GDP data drops to 5.4% from July to September 2024, down from 6.7%.</td></tr>
</table>

Delhi Sultanate

<table>
<tr><th colspan="4">The Delhi Sultanate (Circa 1200–1400)</th></tr>
<tr><td>Histories</td><td colspan="3">• Histories are known as tarikh (singular)/ tawarikh(plural), in Persian, the language of administration under the Delhi Sultans.
• The authors of tawarikh were learned men, secretaries, administrators, poets and courtiers.
➢ They recounted events and advised rulers on governance, emphasising the importance of just rule.
➢ The authors of tawarikh lived in cities (mainly Delhi) and hardly ever in villages.
➢ They often wrote their histories for Sultans in the hope of rich rewards.
➢ These authors advised rulers on the need to preserve an ideal social order based on birthright and gender distinctions.
➢ Their ideas were not shared by everybody.</td></tr>
<tr><td>Hindustan</td><td colspan="3">• Idea of a geographical and cultural entity like India did exist.
• Term Hindustan did not carry the political and national meanings which we associate with it today.
• When the term was used in the thirteenth century by Minhaj-i-Siraj,he meant the areas of Punjab, Haryana and the lands between the Ganga and Yamuna.
• Term was used in a political sense for lands that were a part of the dominions of the Delhi Sultanate.
• In the early sixteenth century, Babur used Hindustan to describe the geography, the fauna and the culture of the inhabitants of the subcontinent.
• It was similar to how the fourteenth-century poet Amir Khusrau used the word Hind.</td></tr>
<tr><th colspan="4">The Mamluk /Slave dynasty / Ilbari Turks(1206- 1290 AD)</th></tr>
<tr><td rowspan="3">Important Rulers</td><td>Qutbuddin Aibak (1206–1210 AD):</td><td colspan="2">• Turkish slave of Muizzuddin in 1206
• Played an important part in the expansion of the Turkish Sultanate in India after the battle of Tarain.
• Died in 1210 of injuries received after falling from his house while playing chaugan (polo).
➢ Was succeeded by Iltutmish who was the son-in-law of Aibak.</td></tr>
<tr><td>Iltutmish (1210–36)</td><td colspan="2">• Regarded as the real consolidator of the Turkish conquests in north India.
• Bengal and Bihar passed under the suzerainty of Delhi once again.
• Took steps to recover Gwalior and Bayana.
• Sent expeditions against Ranthambore and Jalore to reassert his suzerainty.
• Attacked Nagda, the capital of Mewar (about 22 km from Udaipur), but had to beat a retreat at the arrival of the Gujarat armies, which had come to aid the Rana.
➢ As a revenge, Iltutmish dispatched an expedition against the Chalukyas of Gujarat, but it was repulsed with losses.</td></tr>
<tr><td>Raziya (1236–39)</td><td>About</td><td>In 1236 Sultan Iltutmish's daughter, Raziyya, became Sultan.
Discarded the female apparel and started holding court with her face unveiled.</td></tr>
</table>

<table>
<tr><td rowspan="7">Important Rulers</td><td rowspan="2">Raziya (1236–39)</td><td>Wars and Expeditions</td><td>• Led the army in war.
• Led an expedition against Lahore, and compelled the governor to submit.
• On the way to Sirhind, an internal rebellion broke out in which Yaqut Khan was killed, and Raziya imprisoned at Tabarhinda.
• Won over her captor, Altunia, and after marrying him made a renewed attempt on Delhi.
➢ Defeated and killed in a forest by bandits while she was in flight.
• Sent an expedition against Ranthambore to control the Rajputs.</td></tr>
<tr><td>Inscriptions</td><td>• On her inscriptions and coins Raziyya mentioned that she was the daughter of Sultan Iltutmish.
➢ This was in contrast to the queen Rudramadevi (1262–1289), of the Kakatiya dynasty of Warangal, part of modern Andhra Pradesh.
➢ Rudramadevi changed her name on her inscriptions and pretended she was a man.</td></tr>
<tr><td rowspan="5">Balban (1246–87)</td><td colspan="2">• Ulugh Khan, known in history by his later title of Balban.
• Ascended the throne in 1265.
• Era of centralisation started with the Balban.
• Died in 1286.</td></tr>
<tr><td>Power</td><td>• Sought to constantly increase the prestige and power of the monarchy to face the internal and external dangers facing him.
➢ Declared that he was the descendant of the legendary Iranian king Afrasiyab.
➢ Determined to finally break the power of the chahalgani and to exalt the power and prestige of the monarchy.</td></tr>
<tr><td>Policy</td><td>• Adopted a policy of blood and iron
• The Meos were hunted down and killed, the forests around Delhi cut down.
➢ Forests cleared in the doab and in Katehar (modern Rohilkhand).
➢ Rebellious villagers were destroyed.
➢ Men, women and children enslaved.</td></tr>
<tr><td>Court Etiquettes</td><td>• Maintained a magnificent court.
• sijada and paibos (prostration and kissing the monarch's feet) were practiced.
• Administered justice with extreme impartiality.</td></tr>
<tr><td>Army</td><td>• Organized a strong centralised army.
• Establishment of many military out-posts (thanas).
• To deal with internal disturbances and to repel the Mongols
• Reorganized the military department (diwan-i-arz) to repel the Mongols.</td></tr>
</table>

Mongol Threat on India	***In 1221***	• After the defeat of the Khwarizmi ruler, the crown prince Jalaluddin, fled and was pursued by Changez Khan. • Jalaluddin fought a brave battle on the bank of the Indus, and after being defeated, he crossed over to India. • Iltutmish, who was ruling at Delhi at the time, tried to appease the Mongols by politely refusing a request from Jalaluddin for asylum. • Jalaluddin remained, for some time, in the area between Lahore and the river Sutlej, that is the Cis-Sutlej area. • This resulted in a series of Mongol attacks.
	In 1241	• Tair Bahadur, the commander of the Mongol forces in Herat, Ghur, Ghazni and Turkhistan, appeared at Lahore. . • The Mongols sacked and almost depopulated the town.
	In 1245	• The Mongols invaded Multan,and a march by Balban saved the situation. • Balban fought against the Mongols stoutly ➢ The frontiers of Delhi gradually receded from the river Jhelum to the Beas, which flowed between the rivers Ravi and the Sutlej. • Multan was recovered by Balban, but it remained under heavy Mongol pressure. • Balban tacitly agreed to leave the major portion of the Punjab under the Mongol control. ➢ The Mongols, on their part, did not make any attack on Delhi.
	In 1299	• In 1299, a Mongol force of 2,00,000 under Qutlugh Khwaja, arrived to conquer Delhi. • The Mongols cut off the communications of Delhi with the neighbouring areas and entered many streets in the city. • Mongols launched a serious campaign to establish their rule over Delhi. • Alauddin Khalji, who was ruling over Delhi, decided to face the Mongols outside Delhi. • In a number of actions, the Indian armies held their own, though in one isolated action the famous general, Zafar Khan, died. • After some time, the Mongols withdrew without risking a full-scale battle.
	In 1303	• The Mongols appeared again with a force of 1,20,000. • Alauddin Khalji, who was campaigning in Rajputana against Chittor, rushed back and fortified himself at his new capital, Siri, near Delhi. • The two armies camped facing each other for two months. • During this period, the citizens of Delhi had to suffer many hardships. • There were daily skirmishes. • Finally, the Mongols retreated again, without having achieved anything. • Steps by Allaudin ➢ Alauddin Khalji took steps to raise a large, efficient army. ➢ He repelled the great slaughter of Mongol invasions.
	In 1306	• Dawa Khan, the Mongol ruler of TransOxiana, died and • His death was followed by confusion and a civil war. • The Mongols ceased to be a threat to India till a new conqueror, Timur unified the Mongols.
The Khaljis (1290-1320)		
Background	• Jalaluddin Khalji, overthrew the incompetent successors of Balban in 1290. • The Khaljis were of a mixed Turkish— Afghan origin. • The rise of the Khaljis to power ended the Turkish monopoly of high offices	

<table>
<tr><td rowspan="6">Important rulers</td><td>Jalaluddin Khalji (1290–1296 AD)</td><td colspan="2">• Tried to mitigate some of the harsh aspects of Balban's rule.
• First ruler of the Delhi Sultanate to clearly put forward the view that the state should be based on the willing support of the governed.
• Since the large majority of the people in India were Hindus, the state in India could not be a truly Islamic state.</td></tr>
<tr><td rowspan="5">Alauddin Khalji (1296-1316):</td><td colspan="2">• Adopted methods of utmost severity and ruthlessness.
• Framed regulations to prevent the nobles from conspiring against him.
➢ Forbid to hold banquets or festivities, or to form marriage alliances without the permission of the sultan.
➢ Discouraged festive parties and banned the use of wines and intoxicants.
➢ Instituted a spy service to inform the sultan of all that the nobles said and did.</td></tr>
<tr><td>In 1299</td><td>• An army under two of Alauddin Khalji's noted generals marched against Gujarat by way of Rajasthan.
• Raided and captured Jaisalmer also.
• The Gujarat ruler, Rai Karan fled without offering a fight.
• The chief cities of Gujarat, including Anhilwara where many beautiful buildings and temples had been built over generations, were sacked.
• Famous temple of Somnath which had been rebuilt in the twelfth century was also plundered and sacked.</td></tr>
<tr><td>In 1301</td><td>• Alauddin himself had to march against Ranthambhor, which was being ruled by the Chauhan successors of Prithviraj.
• Its ruler was then Hamirdeva.
• Amir Khusrau, who went along with Alauddin gave graphic description of the fort and its investment.
➢ After three months of close siege, the fearful jauhar ceremony took place.
➢ The women mounted the funeral pyre, and all the men came out to fight to the last.
➢ This is the first description we have of the jauhar in Persian.</td></tr>
<tr><td>Chittor</td><td>• Alauddin invested in Chittoor
• After a valiant resistance by the besieged for several months, Alauddin stormed the fort (1303).
• The Rajputs performed jauhar and most of the warriors died fighting.
• Chittor was assigned to Alauddin's minor son, Khizr Khan, and a Muslim garrison was posted in the fort</td></tr>
<tr><td>South India</td><td>• Between 1309 and 1311, Malik Kafur led two campaigns in south India
• The first against Warangal in the Telangana area
• The other against Dwar Samudra (modern Karnataka), Mabar and Madurai (Tamil Nadu).
• For the first time, Muslim armies penetrated as far south as Madurai and brought back untold wealth.
• Kafur had plundered a number of wealthy temples, such as those at Chidambaram.
• But he had to return to Delhi without defeating the Tamil armies
• Kafur was able to force the rulers of Warangal and Dwar Samudra to sue for peace.
• To surrender all their treasures and elephants, and to promise an annual tribute.</td></tr>
</table>

Important rulers	***Alauddin Khalji (1296-1316)***	***Death***	• After Alauddin Khalji's death in 1316, • Malik Kafur, raised a minor son of Alauddin to the throne and imprisoned or blinded his other sons. • Soon after this, Kafur was killed by the palace guards, and a Hindu convert, Khusrau, ascended the throne. • In 1320, a group of officers led by Ghiyasuddin Tughlaq broke out • There was open rebellion and in a hard fought battle outside the capital, Khusrau was defeated and killed.
Market Control Policy of Alauddin	***Fixed Cost of all Commodities***	• Alauddin fixed the cost of all commodities • Set up three markets at Delhi, one market for foodgrains, the second for costly cloth, and the third for horses, slaves and cattle. • Each market was under the control of a high officer called shahna • Maintained a register of the merchants, and strictly controlled the shopkeepers and the prices. • To ensure a regular supply of cheap foodgrains, he declared that the land revenue in the doab region would be paid directly to the state. ➢ i.e the villages in the area would not be assigned in iqta to anyone.	
	Control of prices	• Barani tells us that prices were not allowed to increase by a dam or a paisa even during the time of famine. ➢ wheat sold at 7 1⁄2 jitals a man, barley at 4 jitals, good quality rice at 5 jitals. • Control of the prices of horses was impo rtant for the sultan . • Without the supply of good horses at reasonable prices to the army, the efficiency of the army could not be maintained. ➢ Good quality horses could be sold only to the state.	
	Land Revenue	• The land revenue was raised to half of the produce. • Raised the state demand and obliged the peasant to pay in cash. • Peasants were forced to sell their food grains at low price to banjaras. • They carried them to the towns and sold them at prices fixed by the state. • To ensure that there was no hoarding, all the banjaras were registered, and their agents and their family were held collectively responsible for any violations. • States set up warehouses and stocked them with food grains. ➢ They were released whenever there was a famine or a threat of a shortfall in supply.	
	Payment system	• Realization of land revenue in cash enabled Alauddin to pay his soldiers in cash. • He was the first sultan in the Sultanate to do so. • Asatvar (cavalryman) in his time was paid 238 tankas a year, or about 20 tangos a month.	
Agrarian Reforms of Alauddin	***Assessment of land revenue***	• Insisted that in the doab, land revenue would be assessed on the basis of measuring the land under cultivation. • Rich and the powerful in the villages who had more land could not pass on their burden to the poor.	

Agrarian Reforms of Alauddin	***Pay same taxes***	• Landlords of the area, called khuts and muqaddams, should pay the same taxes as the others. • Pay taxes on milch cattle and houses like the others. • Forgo other illegal cesses which they were in the habit of realizing. • Direct collection of land revenue by the state, based on measurement, could only succeed if the Amils and other local officials were honest. ➢ Sufficient salaries enabled them to live in comfort. ➢ He insisted that their accounts should be audited strictly.
	Types of Taxes	*There were three types of taxes*: • On cultivation called kharaj and amounting to about 50 per cent of the peasant's produce. • On cattle • On houses.
The Tughlaqs (1320—1412)		
About		• Ghiyasuddin Tughlaq established a new dynasty which ruled till 1412. • The Tughlaqs provided three competent rulers: Ghiyasuddin, his son Muhammad bin Tughlaq (1324—51), and his nephew Firuz Shah Tughlaq (1351—88). ➢ The first two of these sultans ruled over an empire which comprised almost the entire country. ➢ Compared to the first two Sultans, the empire of Firuz Shah Tughlaq was smaller ➢ After the death of Firuz, the Delhi Sultanate disintegrated and north India was divided into a series of smaller states. ➢ Delhi was invaded by Timur in 1398 .
Muhammad Tughlaq's Experiments		• Transfer of the capital from Delhi to Deogir. ➢ Deogir had been a base for the expansion of Turkish rule in south India ➢ Muhammad Tughlaq himself had spent a number of years there as a prince.
	South India	Difficulties to bring the South India under control The people of the area were restive under what they felt was an alien rule. Muslim nobles had tried to take advantage of this situation to proclaim their independence there. The most serious rebellion was that of a cousin of Muhammad Tughlaq, Gurshasp Against whom the sultan had to proceed personally.
	Deogiri and Delhi	• Attempts to make Deogir as Second Capital • It appears that the sultan wanted to make Deogir a second capital to control south India better. ➢ Ordered officers, their followers and leading men, to shift to Deogir which was renamed Daulatabad. ➢ No attempt was made to shift the rest of the population. ➢ Delhi remained a large and populous city in the absence of the sultan. ➢ Coins minted in Delhi, while the sultan was at Deogir. • Though roads were built and rest houses were set up, Daulatabad was more than 1500 km away. • People died due to the rigorous journey and the heat • Many of those who reached Daulatabad felt homesick. • After a couple of years, Muhammad Tughlaq decided to abandon Daulatabad. ➢ He soon found that just as he could not control the south from Delhi, he could not control north India from Daulatabad.

<table>
<tr><td rowspan="5">Muhammad Tughlaq's Experiments</td><td>Exodus</td><td colspan="2">• Though the attempt to make Deogir a second capital failed, the exodus did have a number of long-range benefits.
• Brought north and south India closer together by improving communications.
• Many people, including religious divines who had gone to Daulatabad, settled down there.
• New process of cultural interaction between north and south India, as well as in south India itself.</td></tr>
<tr><td rowspan="3">Currency</td><td colspan="2">• Introduction of the 'token currency.
• There was a shortage of silver in the world in the fourteenth century.
• Muhammad Tughlaq decided to introduce a bronze coin which was to have the same value as the silver tanka.
• The idea of a token currency was a new one in India.
• It was difficult to induce the traders as well as the common man to accept it.</td></tr>
<tr><td>Coinage</td><td>• Forge of the Coinage
• Government couldn't prevent people from forging the new coins.
➢ The government was not able to do so, and soon the new coins began to be greatly devalued in the markets.</td></tr>
<tr><td>Token Currency</td><td>• Withdrew of the token currency
• Finally Muhammad Tughlaq decided to withdraw the token currency.
➢ Exchange silver pieces for bronze coins.
➢ Many people exchanged the new coins.
➢ But the forged coins which could be found from tests were not exchanged.
• Failure of these two experiments affected the prestige of the sovereign and meant wastage of money.
➢ However, the government quickly recovered.
➢ The Moroccan traveller, Ibn Battuta, who came to Delhi in 1333, could not see any harmful after-effects of these experiments.</td></tr>
<tr><td>Khurasan Project</td><td colspan="2">• In the early years of Muhammad Tughlaq's reign, the Mongols under their leader Tarmashirin burst into Sind,
• Force reached up to Meerut, about 65 km from Delhi.
➢ Muhammad Tughlaq not only defeated the Mongols in a battle near the Jhelum,
• Occupied Kalanaur and for some time his power extended beyond the Indus up to Peshawar.
➢ The Sultan of Delhi was now in a position to go over to the offensive against the Mongols.</td></tr>
<tr><td>Army Recruitment</td><td colspan="2">• Objective was to reestablish what has been called the scientific frontier viz., the line formed by the Hindukush and Qandahar.
➢ Many of the princes and others who had fled from Central Asia and taken shelter at the court of Muhammad Tughlaq
➢ Thought that it was a good opportunity to oust the Mongols from the area.
➢ The army was disbanded.
➢ Meanwhile, the situation in Central Asia changed rapidly.
➢ Timur united the entire area under his control and posed a fresh threat to India.</td></tr>
</table>

<table>
<tr><td rowspan="6">Muhammad Tughlaq's Experiments</td><td>Qarachi Expedition</td><td colspan="2">• This expedition was launched in the Kumaon hills in the Himalayas,
• The expedition was aimed at Kashmir in order to control the entry of horses from the Chinese side, i.e., Sinkiang.
➢ It never aimed at the conquest of China, as some later historians have suggested.
➢ After some success, the armies went too far into the inhospitable region of the Himalayas, and suffered a disaster.
➢ The hill rajas accepted the overlordship of Delhi.
➢ An expedition was undertaken in the Kangra hills also.
➢ Thus, the hill regions were fully secured.</td></tr>
<tr><td rowspan="4">Agrarian Reforms</td><td colspan="2">• Did not believe in the policy of trying to reduce the Khuts and muqaddams/ mandals(headmen in the villages) to the position of ordinary cultivators.
➢ An adequate share of the land revenue for the state.
➢ Measures had a long term impact but failed disastrously during his reign.</td></tr>
<tr><td>Share of the State</td><td>• Share of the state remained half and was fixed arbitrarily, not on the basis of actual production.
➢ Prices were fixed artificially for converting the produce into money.
➢ Severe famine which ravaged the area for half a dozen years made the situation worse.
➢ Efforts at relief by giving advances for cattle and seeds, and for digging wells came too late.
➢ The sultan left Delhi and for two and half years lived in a camp called Swargadwari.</td></tr>
<tr><td>Cultivation in the doab.</td><td>Scheme to extend and improve cultivation in the doab.
Set up a separate department called diwan-i-amir-i-kohi.</td></tr>
<tr><td>Division into Blocks</td><td>• Area was divided into development blocs headed by an official.
➢ Was to extend cultivation by giving loans to the cultivators
➢ To induce them to cultivate superior crops.
➢ wheat in place of barley, sugarcane in place of wheat, grapes and dates in place of sugarcane, etc.</td></tr>
<tr><td>Failure of the Scheme</td><td>• The men chosen for the purpose proved to be inexperienced and dishonest
• Misappropriated the money for their own use.
• Large sums of money advanced for the project could not be recovered.
• The policy advocated for extending and improving cultivation was not lost.
• It was taken up by Firuz Shah and even more vigorously later on by Akbar.</td></tr>
<tr><td>Reforms in Nobility</td><td>Composition</td><td>• Muhammad Tughlaq entertained people who did not belong to noble families.
• But belonged to castes such as barbers, cooks, weavers, wine-makers, etc.
• He even gave them important offices.
• Most of these were the descendants of the Muslim converts, though a few Hindus were also included.
• Muhammad Tughlaq also welcomed foreigners to the nobility, a large number of whom came to his court.</td></tr>
</table>

Muhammad Tughlaq's Experiments	***Reforms in Nobility***	***Impact of Diversity***	• No sense of cohesion could develop among them. • No sense of loyalty towards the sultan. • The vast extent of the empire provided favourable opportunities for rebellion. • For striving to carve out independent spheres of authority.
Process of its disintegration	***Place of rebellion***	• The rebellions took place one after another in different parts of the empire. ➢ In Bengal, in Mabar (Tamil Nadu), in Warangal, in Kampili (Karnataka), in West Bengal, in Awadh, and in Gujarat and Sindh. ➢ Muhammad Tughlaq dashed from one part of the country to the other to suppress the rebellions and wore out his armies.	
	Rebellions in South India	• Organised by the local governors of south India created panic at Sultan • After some time, plague broke out in the army and two thirds of the army perished in this plague. • Soon after the return of the sultan from south India, • Another rebellion there, led by two brothers, Harihara and Bukka. • They set up a principality which gradually expanded. • This was the Vijayanagara empire which soon embraced the entire south.	
	Rebellions at other Places	• Further north, in the Deccan, some foreign nobles set up a principality near Daulatabad which expanded into the Bahmani empire. • Bengal also became independent. • With a great effort, Muhammad Tughlaq was able to quell the rebellions in Awadh, Gujarat and Sindh. • While still in Sindh, Muhammad Tughlaq died, and was succeeded by his cousin, Firuz Tughlaq.	
Firoz Shah Tughlaq (1351–1388 AD)	• He was faced with the problem of preventing the imminent break-up of the Delhi Sultanate. ➢ Adopted a policy of trying to appease the nobles, the army and the theologians. ➢ Asserted his authority over only such areas which could be easily administered from the centre.		
	Campaigns	• Made no attempt to reassert his authority over south India and the Deccan. • He led two campaigns into Bengal, but was unsuccessful in both. • Firuz led a campaign against the ruler of Jajnagar (Orissa). • He desecrated the temples there and gathered a rich plunder, but made no attempt to annex Orissa. • He also led a campaign against Kangra in the Punjab hills. • His longest campaigns were to deal with rebellions in Gujarat and Thatta. • Although the rebellions were crushed, the army suffered great hardship due to losing its way in the Rann of Kutch.	
	Administration	• Made the offices and iqta hereditary to please the nobles. • Extended the principle of heredity to the army as well. • Soldiers were not to be paid in cash, but by assignments on the land revenue of villages. • Military administration became lax. • Gave a number of important concessions to the theologians. ➢ Prohibited the practice of Muslim women going out to worship at the graves of saints. ➢ Persecuted a number of Muslim sects which were considered heretical by the theologians.	

Firoz Shah Tughlaq (1351–1388 AD)	***Taxation***	• Jizyah became a separate tax. • Earlier, it was a part of land revenue. • Refused to exempt the Brahmans from the payment of jizyah since this was not provided for in the sharia. • Only women, children, the disabled and the indigent who had no means of livelihood were exempt from it.
	Music and Art	• Ordered that the beautiful wall paintings in his palace be erased. • Patronized music, and despite his orthodoxy, was fond of wine. • First ruler who took steps to have Hindu religious works translated from Sanskrit into Persian. • Many books on music, medicine and mathematics were also translated from Sanskrit into Persian during his reign.
	Humanitarian Measures	• Banned inhuman punishments such as cutting of hands, feet, nose, etc., for theft and other offences. • Set up hospitals for free treatment of the poor, and ordered the kotwals to make lists of unemployed persons. • Provided dowries for the daughters of the poor. • Measures were designed to help Muslims of good families who had fallen into bad times. • The state was not meant merely for awarding punishments and collecting taxes, but was a benevolent institution as well.
	Economic Improvement	• Set up a large department of public works which looked after his building programme. • Repaired and dug a number of canals. ➢ Longest canal was about 200 kilometres which took off from the river Sutlej to Hansi; ➢ canals were meant for irrigation purposes, and also for providing water to some of the new towns which Firuz built. ➢ Towns like Hissar-Firuzah or Hissar (in modern Haryana) and Firuzabad (in modern Uttar Pradesh) exist even today.
	Economic and Political	• Ordered his officials that whenever they attacked a place, they should select handsome and well-born young boys and send them to the sultan as slaves. • Gradually gathered about 1,80,000 slaves. • Trained for various handicrafts, and posted in the royal workshops (karkhanas). ➢ Also formed a corps of soldiers who would be directly dependent on the sultan.
	Bandagan	• The consolidation of a kingdom as vast as the Delhi Sultanate needed reliable governors and administrators. ➢ Rather than appointing aristocrats and landed chieftains as governors. ➢ The early Delhi Sultans, especially Iltutmish, favoured their special slaves purchased for military service, called bandagan in Persian. • They were carefully trained to man some of the most important political offices in the kingdom. ➢ Since they were totally dependent upon their master, the Sultan could trust and rely upon them. • The Khaljis and Tughluqs continued to use bandagan and also raised people of humble birth, who were often their clients, to high political positions. • This also introduced an element of political instability. ➢ Slaves and clients were loyal to their masters and patrons, but not to their heirs.

<table>
<tr><th colspan="4">Government, and Economic and Social Life under the Delhi Sultanate</th></tr>
<tr><td rowspan="5">Government and Administration</td><td>Sultan</td><td colspan="2">• Many of the Turkish sultans in India declared themselves lieutenant of the faithful, i.e., of the Abbasid caliph at Baghdad
• Included his name in the khutba in the Friday prayers.
• By proclaiming Caliph's supreme position, the sultans at Delhi were proclaiming that they were a part of the Islamic world.
• The sultan's office was the most important in the Sultanat and supreme political, military, and even legal authority was vested in him.
• No clear law of succession developed among Muslim rulers.
• Military strength was the main factor in succession to the throne.
• The Sultan and his chief nobles enjoyed a standard of living.
• The palace of Muhammad Tughlaq has been described by Ibn Battutah.
• Person who wanted to visit the sultan had to pass through three lofty gates which were heavily guarded.
• The court of thousand pillars was a huge hall supported by polished wooden pillars and was decorated with all kinds of costly materials and furnishings.
• This was the place where the sultan held his public court.
• Almost every sultan had a haram containing queens and a large number of slaves from various countries.
• The nobles tried to ape the sultans in ostentatious living.
• Had magnificent palaces to live in, they used costly articles of apparel and were surrounded by a large number of servants, slaves and retainers.</td></tr>
<tr><td>Nature of The State</td><td colspan="2">• The Turkish state in India was militaristic and aristocratic.
• In a formal sense, the state was Islamic.
• The Sultans were keen to emphasize the Muslim character of the state.
• Follow the Holy Law (sharia) as far as possible.
• The sultans had to supplement the Muslim law by framing their own regulations (zawabit).
➢ This is why the historian Barani refused to consider the state in India as truly Islamic, but one based on worldly or secular considerations (jahandari).</td></tr>
<tr><td rowspan="3">Taxes</td><td colspan="2">• As for the Hindu subjects, from the time of the Arab invasion of Sind, they had been given the status of zimmis or protected people .
• Those who accepted the Muslim rule and agreed to pay tax called jizyah.
• This was really a tax in lieu of military service, and was paid on a graduated scale
• Women, children and the indigent, who had insufficient means, were exempted from it.
• The Brahmans also remained exempt, though this was not provided for in the Muslim law.</td></tr>
<tr><td>Jizyah</td><td>At first, jizyah was collected along with land revenue.
• It was difficult to distinguish jizyah from land revenue since all the cultivators were Hindus.
• Later, Firuz Shah Tughlaq while abolishing many illegal cesses.
• jizyah a separate tax and he levied it on the Brahman also.</td></tr>
<tr><td>Khums</td><td>Khums consisted of one fifth of the war booty and one fifth on mines and treasure trove.</td></tr>
</table>

Government and Administration	***Central Administration***	***Zakat***	• It was one of the religious duties enjoined upon all Muslims . • They had to give the 40th part of their annual savings to the needy and the travellers. • It is often suggested that the practice of paying zakat was started by the Prophet himself . • It had been made obligatory for all Muslims, who had financial means, to do so. • Thus essentially zakat was not a tax to be levied by the rulers. • During the sultanate period Firoz Shah Tughlaq collected zakat as a regular tax and kept a separate account . On imports and exports particularly the Muslim traders were obliged to pay a two and half percent zakat (alms tax) .
			• A definite system of administration developed towards the end of the thirteenth century. • The key figure in administration was the wazir. ➢ In the earlier period, the wazir were primarily military leaders. ➢ In the fourteenth century, the wazir began to be considered more an expert in revenue affairs. ➢ Presided over a large department dealing both with income and expenditure. ➢ A separate Auditor General for scrutinizing expenditure, and an Accountant General for inspecting income worked under the wazir.
		Diwan i-arz or the military department.	• The head of this department was called the ariz-i-mamalik. • The ariz was not the commander-in-chief of the army, since the sultan himself commanded all the armed forces. • The special responsibility of the ariz's department was to recruit, equip and pay the army. • The office of the ariz was an important one under the Seljuks, but we hear of it in India for the first time under Balban as a separate department.
		Branding System	• Alauddin insisted upon being a regular muster of the armed forces. ➢ He also introduced the branding system (dagh) of the horses so that the soldiers may not bring horses of poor quality to the muster. ➢ A descriptive roll of each soldier was also maintained. • The army was posted in different parts of the country, with a strong contingent remaining with the ruler in the capital. ➢ Of all the Delhi rulers, Alauddin Khalji had the largest standing army. ➢ Alauddin was also the first sultan who paid his soldiers fully in cash. ➢ The efficiency of Alauddin's army was the main factor in his ability to contain the Mongol invasions .

Government and Administration	***Central Administration***	***Diwan-i-Risalat***	• The diwan-i-risalat dealt with religious matters, pious foundations and stipends to deserving scholars and men of piety. • It was presided over by the chief sadr, who was generally a leading qazi. • He was generally also the chief qazi-the chief qazi was the head of the department of justice. • Qazis were appointed in various parts of the empire, particularly in those places where there was a sizable Muslim population. • The qazis dispensed civil iaw based on the Muslim law (sharia). • The Hindus were governed by their own personal laws which were dispensed by panchayats in the villages, and by the leaders of the various castes in the cities. • Criminal law was based on regulations framed for the purpose by the rulers.
		Diwan-i-Insha	• The diwan-i-insha dealt with state correspondence. • All the correspondence, formal or confidential, between the ruler and the sovereigns of other states, and with his subordinate officials was dealt with by this department. • The rulers posted intelligence agents called barids in different parts of the empire to keep them informed of what was going on. • Only a nobleman who enjoyed the fullest confidence of the ruler was appointed the chief barid.
Ruler's Household	• Another important department of state. • It looked after the personal comforts of the sultan • the requirements of the large numbers of women in the royal household. • It also looked after a large number of karkhanas or departments in which goods and articles needed by the king and the royal household were stored. • Sometimes, these articles were manufactured under royal supervision.		
Department by Firoz Shah Tughlaq	• Firuz Tughlaq had set up a separate department of slaves, many of whom were employed in these royal 'workshops'. • The officer in charge of all these activities was called wakil-i-dar. • He was also responsible for the maintenance of proper decorum at the court, and placing nobles in their proper order of precedence at formal receptions. • Firuz also set up a separate department of public works which built canals and many of his public buildings.		
Local Administration	***Iqtas***	• When the Turks conquered the country, they divided it into a number of tracts called iqtas • Parcelled out among the leading Turkish nobles. ➢ The holders of these offices were called muqtis or walis. ➢ It were these tracts which later became provinces or subas. ➢ At first, the muqtis were almost independent. ➢ As the central government became stronger and gained experience, it began to control the muqtis more closely.	

Local Administration	***Iqtadar and Muqti***	• Like the earlier Sultans, the Khalji and Tughluq monarchs appointed military commanders as governors of territories of varying sizes. ➢ These lands were called and their holder was called iqtadar or muqti. ➢ The duty of the muqtis was to lead military campaigns and maintain law and order in their iqtas . ➢ In exchange for their military services, the muqtis collected the revenues of their assignments as salary. ➢ They also paid their soldiers from these revenues.
	Pargana	• Below the provinces were the shiqs and below them the pargana. ➢ The villagers were grouped into units of 100 to 84 (traditionally called chaurasi). ➢ The pargana was headed by the amil. ➢ The most important persons in the village were the khut (landowners) and muqaddam or headman. ➢ There was a village accountant or patwari.
Economic and Social Life	***Ibn Battutah***	• A resident of Tangier in North Africa, visited India in the fourteenth century and lived at the court of Muhammad Tughlaq for eight years. ➢ He travelled widely all over India and wrote of the country, including fruits, flowers, herbs, etc., the condition of the roads, and the life of the people. ➢ Rice and sugarcane were produced in the east and south and wheat, oilseeds, etc.in the north. ➢ The soil was so fertile that it could produce two crops every year, rice being sown three times a year. ➢ Sesame, indigo and cotton were also grown.
	Rural Life and Peasantry	• The village headmen (muqaddams) and smaller landlords (khuts) enjoyed a higher standard of life. • The peasant continued to work hard. • There were recurring famines and wars in different parts of the country and these added to the hardships of the peasants. • A section which enjoyed a high standard of life were the Hindu rais or autonomous rajas, many of whom continued to hold their previous estates. ➢ There are a number of references to the visits of the Hindu rais to the court of Balban.
	Trade, Industry and Merchants	With the consolidation of the Delhi Sultanate, there was improvement of communications.
	Currency System	The establishment of a sound currency system based on the silver tanka and the copper dirham,
	Trade	• There was a definite growth of trade in the country. • It was marked by the growth of towns and town life.
	Important Cities	• Ibn Battutah calls Delhi the largest city in the eastern part of the Islamic world. • Daulatabad (Deogir) equalled Delhi in size, an index of the growth of trade between the north and the south. • Other important cities of the times were Lahore and Multan in the northwest, • Kara and Lakhnauti in the east, and Anhilwara (Patan) and Cambay (Khambayat) in the west. • Cambay in Gujarat was famous for textiles and for gold and silver work.

Economic and Social Life	***Craft***	• Sonargaon in Bengal was famous for raw silk and fine cotton cloth (muslin) • Other handicrafts such as leather work, metal work, carpet weaving, wood-work including furniture, stone cutting, etc. • New crafts introduced by the Turks included the manufacturer of paper. • The art of manufacturing paper had been discovered by the Chinese in the second century. • It was known in the Arab world in the eighth century, and travelled to Europe only during the fourteenth century.
	Textiles	• The production of textiles was also improved by the introduction of the spinning-wheel. ➢ Cotton could be cleaned faster and better by wider use of the cotton carder's bow (dhunia). • Fine Indian textiles were introduced to China as well where it was valued more than silk. ➢ India imported from West Asia high grade textiles (satin, etc.) glassware and horses. ➢ From China it imported raw silk and porcelain. ➢ Ivory was imported from Africa and spices from Southeast Asia, in return for Indian textiles.
	India's Foreign Trade	• Both overland and overseas was truly an international enterprise. • The Arabs were the dominant partners in the Indian Ocean trade. • They had by no means ousted the Indian traders, viz., the Tamils, Kalingas and Gujaratis, both Hindu and Muslim. • The coastal trade and trade between the coastal ports and north India was in the hands of Marwaris and Gujaratis. • The Muslim Bohra merchants also participated in this trade. • The overland trade with Central and West Asia was in the hands of Multanis who were mostly Hindus but included Muslims, who were Khurasanis, Afghans, Iranians, etc.
	Travel	• Travel was always risky due to robbers and dacoits and various marauding tribes. • Royal roads were kept in good shape and there were many sarais on the way for the comfort and safety of the travellers. • In addition to the royal road from Peshawar to Sonargaon, Muhammad Tughlaq built a road to Daulatabad.
	Posts	• Arrangements for the post being carried quickly from one part of the country to another. • It was done by relays of horses or even more efficiently and quickly by runners who were posted every few kilometres in towers. • Runner continually clanged a bell as he ran so that the man on the next relay may be able to see him from the tower and get ready to take his burden. • By means of these relays, fresh fruits were obtained for the sultan from Khurasan. • Economic life was quickened in the period by the improvement of communications and the growth of trade, both overland and by sea.

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