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Day 32
Revision Notes

English

APPSC Group 1
1,000 Topics in 100 Days

Topics 311–320

Topic 311

Plassey and Buxar: British conquest of Bengal

1. Concept in one line

Between 1757 and 1765 the English East India Company turned its trading position in Bengal into political power: it defeated Siraj-ud-Daulah at Plassey (1757), made and unmade nawabs, defeated the combined forces of Bengal, Awadh and the Mughal emperor at Buxar (1764), and in 1765 received the diwani (the right to collect the revenue) of Bengal, Bihar and Orissa. Revision focus: the dates, the persons and what each battle and treaty settled.

2. Revision notes

2.1 Historical background

- The Company's first factory in Bengal stood on the Hugli (1651); permission to fortify Calcutta came in 1696; the zamindari of Sutanuti, Kalikata and Gobindapur in 1698; and in 1717 the emperor Farrukhsiyar issued a farman after John Surman's embassy. Aurangzeb had also granted a separate farman allowing duty-free trade.
- The Carnatic Wars. Clive had seized Arcot in 1751. When the Seven Years' War began, the first British force sent out was diverted to Bengal, and the English took Chandernagore from the French in 1757.
- After Plassey, Mir Jafar invited the Dutch, and the English defeated them at Bedara near Chinsura in November 1759.

2.2 The background: why the Company and the nawabs clashed

Point	Key details
The Company's trade in Bengal	the Company persuaded Aurangzeb to grant a farman "granting the Company the right to trade duty free". The nawabs Murshid Quli Khan, Alivardi Khan and Siraj-ud-Daulah refused it concessions, demanded tributes for the right to trade, and denied it the right to mint coins
The farman of 1717 and the misuse of dastaks	The farman of 1717 freed goods carrying the Company's dastak (pass) from checking at the toll posts. Company servants used this exemption for their own private trade too, above all in salt and tobacco, and sold dastaks to Indian merchants, who then escaped the duties as well. Honest Indian traders were ruined and the nawab lost revenue. Officials of the Company who carried on private trade "refused to pay" duty, "causing an enormous loss of revenue for Bengal"

Point	Key details
The fortification of Calcutta	The nawabs would not let the Company extend its fortifications. Unauthorised fortification of Calcutta was a grievance of Siraj-ud-Daulah; the Company's governor ignored his demands to stop
The Black Hole incident	After the fort at Calcutta surrendered on 20 June 1756, "a number of English captives suffocated in a jail cell". Holwell, a survivor, wrote that 146 prisoners were shut in a small guardroom for the night and only 23 came out alive. Later writers dispute his figures: Stanley Wolpert, in *A New History of India*, estimates 64 prisoners and 21 survivors. Wolpert holds that Siraj-ud-Daulah neither ordered the imprisonment nor was told of it

2.3 Siraj-ud-Daulah and the loss and recapture of Calcutta

- **Siraj-ud-Daulah** succeeded Alivardi Khan as Nawab of Bengal in 1756.
- After negotiations failed, the Nawab "marched with 30,000 soldiers to the English factory at Kassimbazar", and then to Calcutta to take control of the Company's fort.
- **June 1756:** the Company's governor and most of his staff fled to the ships on 16 June, and the fort at Calcutta surrendered on 20 June.
- **2 January 1757:** Robert Clive and Admiral Charles Watson retook Calcutta. The Nawab had to restore the Company's privileges and pay compensation.
- **March 1757:** the English took Chandernagore; the French surrendered on 24 March. Clive then plotted to replace the Nawab.

2.4 The Battle of Plassey, 23 June 1757

- **Place:** Plassey (Palashi), on the Bhagirathi, in Bengal. "Plassey is an anglicised pronunciation of Palashi", named after the palash tree.
- **British command:** Robert Clive commanded the Company army at Plassey.
- **The plot:** Clive promised Mir Jafar, one of the Nawab's commanders, that he would be made Nawab. Other Bengali generals were also bribed. Mir Jafar promised large payments to the Company and to the Europeans of Calcutta.
- **The armies:** the Nawab had about 50,000 men and over fifty guns, with French artillerymen; Clive had about 3,000 European and sepoy troops. Mir Madan, the Nawab's cavalry commander, was killed.
- **Mir Jafar's desertion:** Mir Jafar’s troops did not fight, a major cause of the Nawab’s defeat. Mir Jafar commanded about a third of the army and stayed apart on one flank despite the Nawab's pleas. Rai Durlabh and Yar Lutf Khan also kept their troops out of the fighting.
- **The fighting:** a cavalry charge of the Nawab's was broken by the British guns, and the Nawab fled. The military engagement was brief; political betrayal was decisive.
- **After the battle:** Mir Jafar was installed as Nawab. Siraj-ud-Daulah was captured and executed in early July 1757; Mir Jafar’s son Miran had him killed.

- **Why it is called a turning point:** Plassey was the Company’s first major victory in India. The victory made Clive the effective master of Bengal and began a major expansion of Company political power. Its result owed much to betrayal rather than prolonged fighting.

2.5 Mir Jafar and Mir Qasim, 1757 to 1764

- **Mir Jafar** had helped his brother-in-law Alivardi Khan take the government of Bengal in 1740. The Company kept pressing him for money and privileges; Clive got the exemption of the Company servants' private trade from him in 1757, without an express provision in the treaty. When Mir Jafar resisted its demands, the Company replaced him with Mir Qasim. He was removed in 1760, after Clive had left.
- **Mir Qasim**, Mir Jafar's son-in-law, became Nawab on 20 October 1760. In return Burdwan, Midnapore and Chittagong were assigned to the Company for the upkeep of its troops, and large sums were paid to it.
- **Monghyr:** Mir Qasim moved his capital from Murshidabad to Monghyr (now Munger, in Bihar), away from Calcutta's interference. Munger became his capital in 1763.
- **His reforms:** he raised a disciplined army and cleared its arrears; he took back rent-free lands, had a new land survey made, raised the land tax and removed zamindars who resisted; he cut court expenses.
- **The quarrel over duties and dastaks:** the Company's servants would not pay duties on their private trade, and Indian merchants holding their dastaks escaped duties too. Mir Qasim then abolished the duties on internal trade altogether, so that Indian and European traders stood on an equal footing. The Company's men demanded that the duties on Indian traders be put back, and war followed in 1763.
- **War of 1763:** it began at Patna. Mir Qasim's new army lost a series of battles, and he fled to Awadh. Mir Jafar was restored when this war broke out (1763). Mir Jafar died on 5 February 1765.

2.6 The Battle of Buxar, October 1764

- **Date:** 22 October 1764.
- **Place:** Buxar, on the Ganga in Bihar, about 130 km west of Patna.
- **The allies:** in Awadh, Mir Qasim won the support of Shuja-ud-Daulah, the Nawab of Awadh, and the Mughal emperor Shah Alam II joined them. Shah Alam II (Ali Gauhar) was emperor from 1759 to 1806.
- **The Company:** Major Hector Munro commanded.
- **Numbers:** about 8,000 on the British side and about 35,000 on the Indian side.
- **Result:** the allied armies were defeated. Shah Alam II came over to the English camp, Shuja-ud-Daulah fled to Rohilkhand, and Mir Qasim disappeared into obscurity; he died near Delhi in 1777.

Point	Plassey	Buxar
Date	23 June 1757	22 October 1764

Point	Plassey	Buxar
Opponent of the Company	Siraj-ud-Daulah, Nawab of Bengal	Mir Qasim, Shuja-ud-Daulah of Awadh and Shah Alam II, the three together
Company commander	Robert Clive	Hector Munro
How it was decided	Mir Jafar's forces never fought; bribery of generals	The allied armies were beaten in the field
What it led to	Mir Jafar installed as Nawab	The diwani of 1765 and the treaties with the emperor and Awadh

- **Why Buxar is called more decisive:** Buxar consolidated British power over Bengal and Bihar. It ended the Company’s dependence on a puppet nawab and opened the way to imperial recognition of its authority.

2.7 The settlement of 1765

- **Clive's second governorship:** Clive came back as governor and commander in chief, with power to override his council, and reached Calcutta on 3 May 1765. Clive declared: "We must indeed become nawabs ourselves."
- **The diwani:** Shah Alam II legalised the Company's position in Bengal, Bihar and Orissa (1765) by granting it the right to collect their revenue, and settled at Allahabad as the Company's pensioner. The diwani gave the Company the use of Bengal's revenue.
- **Treaty of Allahabad (August 1765):** The imperial farman of 12 August 1765 granted the Company the diwani of Bengal, Bihar and Orissa, with a tribute of 26 lakh rupees a year to the emperor. The treaty with Shuja-ud-Daulah was dated 16 August 1765. These were distinct instruments in the Allahabad settlement:

With	Terms
Shah Alam II, the Mughal emperor	The diwani of Bengal, Bihar and Orissa to the Company. The Company to pay him a tribute of 26 lakh rupees a year. The districts of Kora and Allahabad secured for him
Shuja-ud-Daulah, the Nawab of Awadh	Awadh returned to him; Kora and Allahabad stayed with the emperor. A war indemnity of 50 lakh rupees to the Company. An alliance: the Company would defend him if he paid for the troops sent

- **The dual system, in a line:** by a treaty of 20 February 1765 with the titular nawab (a nawab in name), the Nawab's administration (nizamat) was run through a deputy nominated by the Company, while the Company held the diwani; the result was "power without responsibility".

3. Extra section: chronology (1717 to 1765) and who's who

Year	Event
1717	Farman of Farrukhsiyar; goods under the Company's dastak freed from checking
1740	Alivardi Khan takes the government of Bengal, helped by Mir Jafar
1756	Alivardi Khan dies; Siraj-ud-Daulah becomes Nawab
1756	Siraj-ud-Daulah marches on Kassimbazar and Calcutta; the fort at Calcutta surrenders (20 June); the Black Hole incident that night
1757	Clive and Watson retake Calcutta (2 January); the English take Chandernagore (March)
1757	Battle of Plassey (23 June); Mir Jafar made Nawab; Siraj-ud-Daulah executed (early July)
1759	The English defeat the Dutch at Bedara near Chinsura (November)
1760	Clive leaves (his government ends in February); Mir Qasim made Nawab (20 October)
1763	War between the Company and Mir Qasim; Mir Jafar restored; Mir Qasim flees to Awadh
1764	Battle of Buxar (22 October)
1765	Mir Jafar dies (5 February); treaty with the titular nawab (20 February); Clive reaches Calcutta (3 May); Treaty of Allahabad (August)

Person	Role	Battle
Alivardi Khan	Nawab of Bengal until his death in 1756	Died before Plassey
Siraj-ud-Daulah	Nawab from 1756; took Kassimbazar and Calcutta	Defeated at Plassey
Mir Jafar	Siraj-ud-Daulah's commander who joined Clive; Nawab 1757 to 1760 and again 1763 to 1765	Plassey (his forces did not fight)
Robert Clive	Led the Company's army; governor again from 1765	Won at Plassey
Charles Watson	Admiral who retook Calcutta with Clive	Calcutta, January 1757

Person	Role	Battle
Mir Qasim	Nawab 1760 to 1763; moved the capital to Monghyr; abolished internal duties	War of 1763; on the allied side at Buxar
Shuja-ud-Daulah	Nawab of Awadh; got Awadh back in 1765 on paying an indemnity	Defeated at Buxar
Shah Alam II	Mughal emperor 1759 to 1806; granted the diwani in 1765	On the allied side at Buxar; then joined the English
Hector Munro	Major commanding the Company's army	Won at Buxar

4. Three common exam traps

1. **"Plassey was a hard-fought battle that Clive's army won by force."** A main reason for the defeat was that the forces under one of the Nawab's own commanders never fought, and other generals had been bribed too. The result owed much to betrayal. Do not carry this picture over to Buxar, where the allied armies did fight and were beaten.
2. **"Aurangzeb's farman and the farman of 1717 are one and the same."** They are two different farmans of two different emperors. Aurangzeb granted a farman giving the Company the right to trade duty free. The farman of 1717 was issued by Farrukhsiyar after John Surman's embassy; it freed goods carrying the Company's dastak from checking. Read which emperor and which year the question names.
3. **"146 prisoners died in the Black Hole."** That figure is Holwell's number of prisoners, not of the dead; he said 23 came out alive. The historian Stanley Wolpert puts the prisoners at 64 and the survivors at 21; the number of captives remains disputed. If a question gives a figure, check whose figure it is: 146 and 23 are Holwell's.

Topic 312

Tribunals: Articles 323A and 323B, CAT and others

1. Concept in one line

Part XIV-A of the Constitution (Articles 323A and 323B) lets Parliament, and for the matters listed in Article 323B also a State Legislature, provide by law for tribunals to decide specified kinds of disputes. Revision focus: what each Article covers, how the Central Administrative Tribunal and the State Administrative Tribunals are set up, and what the Supreme Court has held about tribunals and the High Courts.

2. Revision notes

2.1 Where Part XIV-A stands

- Part XIV-A, headed "TRIBUNALS", has two Articles: 323A and 323B. Section 46 of the Constitution (Forty-second Amendment) Act, 1976 inserted it "After Part XIV of the Constitution", so the Constituent Assembly never debated it.
- Tribunals are "judicial or quasi-judicial institutions established by law".
- The Constitution (Seventy-fifth Amendment) Act, 1993 added rent and tenancy to Article 323B(2) as a new sub-clause (h), re-lettering the old (h) and (i) as (i) and (j). Its Statement of Objects and Reasons speaks of "setting up of State-level Rent Tribunals".
- Under Article 136 the Supreme Court may grant special leave "in its discretion" from any judgment or order of any court or tribunal in India; under Article 227 a High Court has superintendence over all courts and tribunals in its territories. Articles 136(2) and 227(4) exclude courts or tribunals constituted under armed-forces law from these respective powers.
- L. Chandra Kumar v. Union of India (18 March 1997; seven judges): the power of judicial review over legislative action vested in the High Courts under Article 226 and in the Supreme Court under Article 32 "is an integral and essential feature of the Constitution, constituting part of its basic structure".

2.2 Article 323A against Article 323B

Point	Article 323A	Article 323B
Marginal heading	Administrative tribunals	Tribunals for other matters
Who may make the law	"Parliament may, by law, provide for the adjudication or trial by administrative tribunals"	"The appropriate Legislature may, by law, provide for the adjudication or trial by tribunals". The Explanation: Parliament or a State Legislature competent to make laws on the matter under Part XI

Point	Article 323A	Article 323B
For which matters	Disputes and complaints on "recruitment and conditions of service" of persons appointed to public services and posts under the Union, a State, a local or other authority, or a corporation owned or controlled by the Government	The matters in clause (2), listed below, on which that Legislature has power to make laws
How many tribunals	An administrative tribunal for the Union and a separate one for each State or for two or more States (clause (2)(a))	A hierarchy of tribunals may be set up (clause (3)(a))
Courts' jurisdiction, as the text says	The law may "exclude the jurisdiction of all courts, except the jurisdiction of the Supreme Court under article 136" (clause (2)(d))	The same words, for the matters within the tribunals' jurisdiction (clause (3)(d))
After L. Chandra Kumar (1997)	Clause (2)(d) unconstitutional to the extent it excludes the High Courts and the Supreme Court under Articles 226/227 and 32	Clause (3)(d) unconstitutional to the same extent
Overriding clause	Clause (3)	Clause (4)

- **The list in Article 323B(2), as it stands now:** (a) levy, assessment, collection and enforcement of any tax; (b) foreign exchange, and import and export across customs frontiers; (c) industrial and labour disputes; (d) land reforms, such as the acquisition of estates defined in Article 31A and ceilings on agricultural land; (e) ceiling on urban property; (f) elections to either House of Parliament or the House or either House of the Legislature of a State, excluding the matters in Articles 329 and 329A; (g) production, procurement, supply and distribution of foodstuffs and other goods that the President declares essential, and control of their prices; (h) rent, its regulation and control and tenancy issues; (i) offences against laws on matters (a) to (h), and fees; (j) matters incidental to (a) to (i).
- Sub-clause (f) covers elections to Parliament and the State Legislatures; the election of the President is not in the list.
- Article 323A(2)(f) lets such a law repeal or amend a Presidential order under Article 371D(3), the special provision for Andhra Pradesh.

2.3 What the Supreme Court held

- **S.P. Sampath Kumar v. Union of India** (decided in 1986, reported in 1987). As L. Chandra Kumar summed it up, the Court accepted that judicial review could be vested in an "alternative institutional mechanism" if it was "an effective and real substitute for the High Court". The Court also wanted the Chief Justice of India, or a committee led by a judge, involved in appointments.

- **L. Chandra Kumar v. Union of India** (18 March 1997; seven judges; Chief Justice A.M. Ahmadi wrote the judgment). Its conclusions (paragraph 100):
- Clause 2(d) of Article 323A and clause 3(d) of Article 323B, "to the extent they exclude the jurisdiction" of the High Courts and the Supreme Court under Articles 226/227 and 32, "are unconstitutional". Section 28 of the Administrative Tribunals Act and the exclusion clauses in other laws made under these Articles are unconstitutional "to the same extent".
- Tribunals may perform a "supplemental role"; they are not substitutes for the High Courts in judicial review. They "continue to act like Courts of first instance" in their areas of law.
- So litigants may not go directly to the High Court even when they question the vires (validity) of a statute or rule. The one exception: when the Act that creates the tribunal is itself challenged, because "a Tribunal which is a creature of an Act cannot declare that very Act to be unconstitutional" (paragraph 94).
- Tribunals can test the constitutional validity of other statutory provisions and rules, but this function is "only supplementary" (paragraph 94).
- "All decisions of these Tribunals will, however, be subject to scrutiny before a Division Bench of the High Court within whose jurisdiction the concerned Tribunal falls."
- Tribunals should be "as far as possible, under a single nodal Ministry", which "should appropriately be the Ministry of Law" (paragraph 97).

2.4 The Central Administrative Tribunal and the State Administrative Tribunals

Parliament made the Administrative Tribunals Act, 1985 under Article 323A.

Point	What the Act says
Central Administrative Tribunal (CAT)	Section 4(1): "The Central Government shall, by notification, establish" it
State Administrative Tribunal	Section 4(2): the Central Government "may, on receipt of a request in this behalf from any State Government", establish one by notification
Joint Administrative Tribunal	Section 4(3): two or more States may agree to share one; the Central Government may then establish it by notification
Who is left out	Section 2: members of the armed forces of the Union; officers and servants of the Supreme Court or of any High Court or courts subordinate to it; the secretarial staff of either House of Parliament or of a State Legislature
Members and Benches	Section 5: a Chairman, Judicial and Administrative Members; a Bench has one of each, or the Chairman or an authorised Member sits alone
Procedure	Section 22: not bound by the Civil Procedure Code but "guided by the principles of natural justice"

Point	What the Act says
Courts shut out	Section 28: in service matters "no court except" the Supreme Court (and industrial tribunals, labour courts and similar authorities) has jurisdiction; read down by L. Chandra Kumar (2.3)

- **CAT (position recorded 7 November 2026):** established under Article 323A in 1985; 19 Benches and 19 Circuit Benches, with 69 Members: 34 Judicial and 35 Administrative.
- **Andhra Pradesh:** A Ministry of Personnel, Public Grievances and Pensions notification, G.S.R. 30(E) of 14 January 2020, rescinded G.S.R. 928(E) of 26 October 1989, abolishing the Andhra Pradesh Administrative Tribunal at the State's request, made with the High Court's concurrence. A later notification corrected a typographical error, with effect from 14 January 2020.

2.5 Other tribunals and their laws

Tribunal	Law it works under	Point to remember
Armed Forces Tribunal	Armed Forces Tribunal Act, 2007	The Administrative Tribunals Act, 1985 does not apply to the armed forces (section 2)
Income Tax Appellate Tribunal	Income-tax Act, 1961, historically; now section 361 of the Income-tax Act, 2025	Set up in 1941; regarded as India’s first tribunal
National Green Tribunal	National Green Tribunal Act, 2010	Environmental disputes

2.6 The Tribunals Reforms Act, 2021 and the Madras Bar Association cases

- **The Act.** The Tribunals Reforms Act, 2021 received assent on 13 August 2021, is deemed to have come into force on 4 April 2021, and repealed the Tribunals Reforms (Rationalisation and Conditions of Service) Ordinance, 2021.
- **Selection and terms, as enacted.** A Search-cum-Selection Committee recommends a panel of two names; for central tribunals it is chaired by the Chief Justice of India or a Supreme Court judge he nominates; for a State Administrative Tribunal, by the Chief Justice of the High Court. Section 5: a Chairperson holds office "for a term of four years or till he attains the age of seventy years, whichever is earlier", and a Member for four years or till sixty-seven. A person under fifty is not eligible (section 3(1)).
- **Madras Bar Association v. Union of India (14 July 2021; 2 to 1).** On the Ordinance. Justices L. Nageswara Rao and S. Ravindra Bhat (majority) struck down the four-year term and the minimum age of 50; Justice Hemant Gupta dissented. Restating its 2020 directions, the Court held that a Chairperson serves five years or till 70, and a Member five years or till 67, and that advocates with at least 10 years' experience are eligible.

- **Madras Bar Association v. Union of India (19 November 2025).** On the Act. Chief Justice B.R. Gavai wrote the judgment; Justice K. Vinod Chandran concurred. The Court struck down provisions of the 2021 Act that repeated what it had struck down in the Ordinance, among them the minimum age of 50, the four-year term and the panel of two names: Parliament may remove the basis of a judgment, but may not re-enact a provision with the same defect. It directed the Centre to set up a National Tribunals Commission within four months.
- **The Tribunals Reforms Act, 2026 (No. 17 of 2026).** It received assent on 13 August 2026, all its provisions came into force on 25 August 2026, and it repeals the Tribunals Reforms Act, 2021. It provides for a National Tribunals Commission of a Chairperson (a former Supreme Court judge or High Court Chief Justice), two Judicial and two Technical Members. A tribunal Chairperson holds office for five years or till 70, and a Member for five years or till 67, whichever is earlier. Provision for a National Tribunals Commission does not by itself establish that the Commission is operational.

2.7 Issues the courts keep raising

- **Independence:** In 2021, the single nodal Ministry that L. Chandra Kumar wanted (2.3) has not come about.
- **Appointments and terms:** the Madras Bar Association cases turned on short terms and the age limits; the 2021 judgment also wanted recommendations decided within three months.
- **Vacancies:** On 3 March 2021, 23 of the 34 sanctioned judicial and administrative posts in the Armed Forces Tribunal were vacant.

3. Extra section: tribunals in the Constitution, the statute book and the Supreme Court, 1976 to 2026

Year	Event	What to remember
1976	Forty-second Amendment Act, section 46	Part XIV-A (Articles 323A and 323B) inserted
1985	Administrative Tribunals Act	CAT established by the Central Government under section 4(1)
1986 (reported 1987)	S.P. Sampath Kumar	A tribunal may stand in for the High Court if it is an effective and real substitute
1993	Seventy-fifth Amendment Act	Rent and tenancy added to Article 323B(2) as sub-clause (h)
18 March 1997	L. Chandra Kumar	Exclusion clauses read down; Division Bench of the High Court scrutinises tribunal decisions
2007	Armed Forces Tribunal Act	A separate tribunal for the armed forces

Year	Event	What to remember
2010	National Green Tribunal Act	Environmental tribunal
14 January 2020	Notification G.S.R. 30(E)	Andhra Pradesh Administrative Tribunal abolished
2020	Madras Bar Association	National Tribunals Commission; five-year terms
4 April 2021	Tribunals Reforms Ordinance	Appellate bodies abolished; four-year terms
14 July 2021	Madras Bar Association	Four-year term and minimum age of 50 in the Ordinance struck down (2 to 1)
13 August 2021	Tribunals Reforms Act, 2021	Assent; deemed in force from 4 April 2021
19 November 2025	Madras Bar Association	Provisions of the Act that repeated the Ordinance struck down; Commission within four months; the Tribunals Reforms Act, 2026 later replaced the 2021 Act

- The pattern: the 1976 text let laws shut out every court except the Supreme Court under Article 136; Sampath Kumar accepted tribunals as substitutes; L. Chandra Kumar brought the High Courts back; the later cases have been about how independent the tribunals are.

4. Three common exam traps

1. **"Because Articles 323A(2)(d) and 323B(3)(d) save only Article 136, the High Courts have no say over tribunals."** That is the 1976 text, not the law today. L. Chandra Kumar (1997) held these clauses unconstitutional to the extent they exclude Articles 226/227 and 32. Tribunal decisions now go before a Division Bench of the High Court, and CAT orders are challenged by writ petition under Article 226/227.
2. **"Every matter in Article 323B(2) has been there from the start."** The list as first enacted had nine sub-clauses, (a) to (i). Rent, its regulation and control and tenancy issues came as sub-clause (h) by the Seventy-fifth Amendment Act, 1993, and the old (h) and (i) became (i) and (j). So the present list runs from (a) to (j).
3. **Mixing up the two Madras Bar Association judgments and the Act's own words.** The judgment of 14 July 2021 was on the Ordinance; the judgment of 19 November 2025 was on the Tribunals Reforms Act, 2021. The 2021 Act as enacted says four years; the Court's 2021 ruling says five years. Read the question carefully: "the Act provides" and "the Court held" have different answers.

Topic 313

Inequality: Lorenz curve, Gini coefficient and trends in India

1. Concept in one line

Inequality is shown by the Lorenz curve, which plots the cumulative share of people against the cumulative share of income or consumption, and is summed up by the Gini coefficient, which turns the gap between that curve and the line of equality into one number on a scale of 0 to 1 (or 0 to 100). Revision focus: how the two are built and read, and what each of India's figures measures: the consumption Gini of the World Bank and the Ministry of Statistics and Programme Implementation (MoSPI), and the income and wealth shares of the World Inequality Lab.

2. Revision notes

2.1 What is being measured

- Inequality can be measured over three things: **income**, **consumption expenditure** and **wealth**. The Lorenz curve and the Gini can be worked out for any of them. A Gini index of 100 represents perfect inequality: one person has the entire measured income, wealth or consumption, and everyone else has none.
- The relevant surveys are the Household Consumption Expenditure Survey (HCES) 2022-23 (August 2022 to July 2023) and 2023-24 (August 2023 to July 2024). Poverty counts the people below a line; inequality looks at how the whole total is shared.

2.2 The Lorenz curve

- It was developed by Max O. Lorenz in 1905, to measure the concentration of wealth.
- **How it is drawn.** Arrange the people from the poorest to the richest and split them into groups (say five groups of 20 per cent). Mark the cumulative share of people on the horizontal axis and their cumulative share of income (or consumption) on the vertical axis. Join the points from (0, 0) to (100, 100).
- **Line of equality:** the diagonal of the square, on which the bottom N per cent of people get N per cent of the income.
- **Line of perfect inequality:** one person has everything; the curve runs along the horizontal axis and rises to 100 per cent only at the very end.
- The Lorenz curve cannot rise above the line of equality. The further it sags away from that line, the more unequal the distribution.

2.3 The Gini coefficient

- It was published by the Italian statistician Corrado Gini in 1912, in "Variabilità e mutabilità".
- **Definition:** the Gini index "measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line."
- **As a formula.** Let A be the area between the line of equality and the Lorenz curve, and B the area below the Lorenz curve. A + B is the whole triangle under the line of equality, which is half the square. Gini = A ÷ (A + B). With both axes running from 0 to 1, A + B = 0.5, so Gini = 2A = 1 - 2B.
- **Range:** 0 is perfect equality and 1 is perfect inequality. Written as a percentage (0 to 100), it is called the Gini index. MoSPI writes it as a fraction (for example 0.284); the World Bank and PIB write it as an index (for example 25.5).

Point	Lorenz curve	Gini coefficient
What it is	A graph	A single number
Built from	Cumulative share of people against cumulative share of income, consumption or wealth	The area between the line of equality and the Lorenz curve, divided by the whole area under the line of equality
Perfect equality	The curve lies on the line of equality	0
Perfect inequality	The curve runs along the horizontal axis and rises only at the end	1 (or 100 as an index)
More inequality shows as	A curve that sags further from the line of equality	A higher number

Four limitations:

- **Not unique:** two different Lorenz curves can give the same Gini coefficient, for example when the two curves cross.
- **Not additive:** the Gini of a whole society is not the sum of the Ginis of its sub-groups.
- **Relative, not absolute:** the Gini of a developing country can rise while the number of people in absolute poverty falls.
- **Not strictly comparable:** surveys differ in method and in what they collect (income or consumption), so the figures are not strictly comparable across countries or even across years within a country.

2.4 Consumption, income and wealth

- **Income versus consumption:** income is typically distributed more unequally than consumption. Consumption is often a better welfare indicator in developing economies. The World Bank generally uses consumption where available, but uses income data for high-income economies; these different measurement bases limit cross-country comparisons.
- **Why a consumption Gini is lower:** the rich save a larger share of their income, so consumption inequality understates income inequality.
- **Coverage limitation:** the 2022-23 and 2023-24 surveys may understate inequality because they may not fully capture wealthier households' consumption.
- **Wealth is more concentrated than income.** In the World Inequality Lab study, the top 1 per cent received 22.6 per cent of India's national income in 2022-23 but held 40.1 per cent of its wealth.

2.5 India's figures in one table

Measure	Figure	Year	Data basis	What it measures
Gini coefficient of consumption expenditure, rural India	0.266; 0.237	2022-23; 2023-24	MoSPI, HCES 2023-24 (PIB, 27 December 2024)	Inequality of total consumption expenditure in rural India, on a scale of 0 to 1
Gini coefficient of consumption expenditure, urban India	0.314; 0.284	2022-23; 2023-24	MoSPI, HCES 2023-24 (PIB, 27 December 2024)	The same, for urban India
World Bank Gini index for India	28.8; 25.5; 23.0	Listed under 2011, 2022 and 2023	World Bank data, Gini index series (updated 8 October 2026)	Inequality of consumption, from the household consumption surveys, on a scale of 0 to 100
India's Gini and rank in PIB's statement	25.5; fourth most equal country	2022, reference year	PIB, "India's Story on Bridging Inequality", 5 July 2025, citing the World Bank's Spring 2025 Poverty and Equity Brief	The World Bank's consumption Gini, compared with other countries' Ginis
Share of national income received by the top 10 per cent	57.7 per cent	2022-23	World Inequality Lab Working Paper 2024/09	Share of pre-tax income per adult (aged 20 and above)

Measure	Figure	Year	Data basis	What it measures
Share of national income received by the top 1 per cent	22.6 per cent	2022-23	The same	The same
Share of national income received by the bottom 50 per cent	15 per cent	2022-23	The same	The same
Share of wealth held by the top 10 per cent	65 per cent	2022-23	The same	Share of total wealth
Share of wealth held by the top 1 per cent	40.1 per cent	2022-23	The same	Share of total wealth

- The World Bank lists each figure under a single year; the surveys behind them are the consumption survey of 2011-12 and the HCES of 2022-23 and 2023-24. Its April 2025 brief put the change as "from 28.8 in 2011-12 to 25.5 in 2022-23". Its Poverty and Inequality Platform shows 23.0 as a consumption Gini from the HCES, under 2023. As on 7 November 2026, 23.0 is its most recent figure for India.

2.6 Trends and measurement bases

- **HCES:** consumption inequality declined from the level of 2022-23 in both rural and urban areas, for India as a whole and in almost all the 18 major States.
- **World Bank:** 27.7 (2004), 27.8 (2009), 28.8 (2011), 25.5 (2022) and 23.0 (2023), with its caution that the latest surveys are likely to understate inequality. Its Poverty and Inequality Platform puts the figures in three comparable spells (2004 and 2009; 2011; 2022 and 2023), so the fall from 2011 to 2022 spans a change of survey.
- **Historical ranking claim (5 July 2025):** the Gini index was 28.8 in 2011 and reached 25.5 in 2022. India was the fourth most equal country, after the Slovak Republic (24.1), Slovenia (24.3) and Belarus (24.4), and more equal than every G7 and G20 country (China 35.7, United States 41.8). The claim used the 25–30 band as “moderately low” inequality. This ranking does not establish comparable income or wealth equality across countries.
- **World Inequality Lab (2024):** the top 1 per cent's shares of income and wealth are at their highest historical levels; the income share of 22.6 per cent is the highest in its series since 1922, above the inter-war colonial period. The series combines income tax tables, national accounts, surveys and rich lists. Data limitations may make these estimates a lower bound.
- **Why the measures differ:** they measure different things. The World Bank and MoSPI measure consumption from household surveys; the World Inequality Lab measures pre-tax income and wealth, using tax data for the top. The World Bank's Ginis for high-income economies are on income, and it warns that its figures are not strictly comparable across countries. Match the year, measurement basis and population coverage before comparing figures.

2.7 Andhra Pradesh

MoSPI's report on HCES 2023-24 (30 January 2025) gives the Gini of total consumption expenditure for each major State.

Gini of consumption expenditure	2022-23 rural	2022-23 urban	2023-24 rural	2023-24 urban
Andhra Pradesh	0.243	0.283	0.196	0.240
All-India	0.266	0.314	0.237	0.284

- In Andhra Pradesh, as in India, the Gini fell in both rural and urban areas, and the urban figure stayed above the rural one. Andhra Pradesh's figures were below the all-India figures in both years.

3. Extra section: a Lorenz curve and a Gini worked out for five groups

Society P has five groups of people, each 20 per cent of the population, arranged from the poorest. Their shares of income are 5, 10, 15, 25 and 45 per cent.

Group	Share of income (per cent)	Cumulative share of people (per cent)	Cumulative share of income (per cent)	Area of the strip under the curve
Poorest 20 per cent	5	20	5	0.2 × (0 + 0.05) ÷ 2 = 0.005
Second 20 per cent	10	40	15	0.2 × (0.05 + 0.15) ÷ 2 = 0.020
Middle 20 per cent	15	60	30	0.2 × (0.15 + 0.30) ÷ 2 = 0.045
Fourth 20 per cent	25	80	55	0.2 × (0.30 + 0.55) ÷ 2 = 0.085
Richest 20 per cent	45	100	100	0.2 × (0.55 + 1.00) ÷ 2 = 0.155

- **Step 1: plot the curve.** Join (0, 0), (20, 5), (40, 15), (60, 30), (80, 55) and (100, 100). At 40 per cent of people the curve is at 15 per cent of income; the line of equality would be at 40.
- **Step 2: area under the curve (B).** Each strip is a trapezium: width 0.2 × the average of its two heights. B = 0.005 + 0.020 + 0.045 + 0.085 + 0.155 = 0.31.
- **Step 3: area between the line and the curve (A).** A = 0.5 - 0.31 = 0.19.
- **Step 4: Gini.** Gini = A ÷ 0.5 = 0.19 ÷ 0.5 = 0.38. Check: 1 - 2B = 1 - 0.62 = 0.38. As an index, 38.

Compare three other cases worked the same way:

Society	Shares of income of the five groups (per cent)	B	Gini
Equal	20, 20, 20, 20, 20	0.5	0 (the curve lies on the line of equality)
Q	8, 12, 16, 22, 42	0.344	0.312
P	5, 10, 15, 25, 45	0.31	0.38
Richest group takes all	0, 0, 0, 0, 100	0.1	0.8

- Q's curve lies closer to the line of equality than P's, so Q has the lower Gini.
- With five groups the Gini cannot reach 1, because everyone inside a group is treated as equal. It reaches 1 only when one person has everything.

4. Three common exam traps

1. **"A higher Gini means a more equal society", and mixing up the two scales.** It is the reverse: 0 is perfect equality. The further the Lorenz curve sags from the line of equality, the larger the area between them and the higher the Gini. MoSPI writes the Gini as a fraction from 0 to 1, while the World Bank and PIB write it as an index from 0 to 100; a Gini of 0.30 and an index of 30 are the same level.
2. **Adding or averaging the rural and urban figures.** MoSPI gives one Gini for rural India and another for urban India. They cannot be added or averaged into an all-India Gini: the Gini of a whole population is not the sum of the Ginis of its parts.
3. **Reading a fall in the Gini as a fall in poverty, or a rise as more poverty.** The Gini measures how the total is shared, not how well people live. A country's Gini can rise while the number of people in absolute poverty falls. Poverty counts the people below a line.

Topic 314

NPAs: classification, causes and resolution through SARFAESI and the IBC

1. Concept in one line

A non-performing asset (NPA) is a bank loan that has stopped earning: for a term loan, interest or instalment overdue for more than 90 days, with other tests for other kinds of loans. Revision focus: how the Reserve Bank of India (RBI) classifies such loans, why they rose until 2018, and which laws and bodies are used to recover or resolve them.

2. Revision notes

2.1 What makes a loan an NPA

- The rules follow the RBI's Master Circular on Income Recognition, Asset Classification and Provisioning (IRACP) pertaining to Advances, 1 April 2025. The RBI's two sets of Directions for commercial banks of 28 November 2025 (on asset classification and provisioning, and on resolution of stressed assets) keep the same tests, classes and provision rates.
- **Overdue.** Any amount due to a bank under any credit facility is "overdue" if it is not paid on the due date fixed by the bank.
- **NPA.** The Master Circular gives a different test for each kind of loan:

Kind of loan	It becomes an NPA when
Term loan	Interest or an instalment of principal stays overdue for more than 90 days
Overdraft or cash credit	The account stays "out of order" for 90 days: the balance stays above the sanctioned limit or drawing power; or there are no credits, or the credits do not cover the interest debited
Bills purchased and discounted	The bill stays overdue for more than 90 days
Crop loan, short duration crop	The instalment of principal or interest stays overdue for two crop seasons
Crop loan, long duration crop	The instalment of principal or interest stays overdue for one crop season
Credit card account	The minimum amount due is not paid in full within 90 days from the payment due date

- **Borrower-wise, not loan-wise.** When one facility of a borrower becomes an NPA, all that bank's facilities to the borrower are treated as NPAs.

- **Upgrading.** An NPA becomes standard again only when the entire arrears of interest and principal are paid.

2.2 The classification in one table

Category	Rule (days overdue, or period as an NPA)
SMA-0 (special mention account)	Principal, interest or any other amount overdue for up to 30 days. Given only for loans other than revolving facilities (such as cash credit and overdraft)
SMA-1	Overdue for more than 30 days and up to 60 days. For cash credit and overdraft: the balance stays above the sanctioned limit or drawing power for that long
SMA-2	Overdue for more than 60 days and up to 90 days (for cash credit and overdraft, the same excess balance)
Sub-standard asset	It has been an NPA for 12 months or less
Doubtful asset	It has remained in the sub-standard category for 12 months
Loss asset	Loss identified by the bank, its auditors or the RBI's inspection, but not written off in full

- **SMA accounts are not NPAs.** They are early warnings. The RBI's Prudential Framework for Resolution of Stressed Assets (7 June 2019) asks lenders to recognise stress immediately on default and classify the account as an SMA.
- The RBI's SMA table for cash credit and overdraft accounts has only SMA-1 and SMA-2; it has no SMA-0.
- Each NPA category needs a different provision (money a bank sets aside against the expected loss); Section 3 gives the rates.

2.3 Why NPAs piled up

The twin balance sheet problem. The Economic Survey 2016-17 (Chapter 4) described India's problem as "overleveraged companies and bad-loan-encumbered banks".

Cause	Key details
Investment boom on borrowed money	The mid-2000s saw "the biggest investment boom in the country's history", financed by a surge in credit
Cost overruns	Project costs rose far above budget, largely because land and environmental clearances took far longer than expected

Cause	Key details
Slower growth	After the global financial crisis, growth was roughly half the double-digit rates the projects had planned for
Fall in commodity prices	Slower growth in China made international steel prices collapse, hitting Indian steel companies
Lending and borrowers' conduct	Aggressive lending, wilful default and loan frauds, along with an economic slowdown
Recognition	The Asset Quality Review (AQR) of 2015 made banks recognise stressed accounts as NPAs. NPAs peaked because of "the increased pace of recognition of NPAs"

- The Survey proposed a Public Sector Asset Rehabilitation Agency (PARA) to buy and resolve the largest stressed loans.
- The Government describes its response as a 4R strategy: recognition, resolution, recapitalisation and reforms.

2.4 The trend: the peak of 2018 and the fall since

Date	Measure	Figure
March 2018	Gross NPA (GNPA) ratio of scheduled commercial banks: the peak	11.18 per cent
March 2018	Net NPA (NNPA) ratio of scheduled commercial banks: the peak	5.94 per cent
March 2025	GNPA and NNPA ratios of scheduled commercial banks	2.2 and 0.5 per cent
March 2026	GNPA ratio of scheduled commercial banks	1.8 per cent, a "multi-decadal low"
March 2026	PCR of scheduled commercial banks	75.6 per cent

- Public sector banks alone: their GNPA ratio fell from 9.11 per cent in March 2021 to 2.58 per cent in March 2025.
- The peak figure depends on the data used. The domestic-operations series gives 11.46 per cent (Rs 9,62,621 crore) for March 2018 (and elsewhere an NNPA peak of 6.1 per cent), while the December 2018 FSR rounds the ratio to 11.5 per cent. Remember: March 2018, GNPA a little over 11 per cent, NNPA about 6 per cent.

2.5 The tools of resolution

Tool	Law or rule	Year	Who decides	Time limit or threshold
Prudential Framework for Resolution of Stressed Assets	RBI directions to lenders	7 June 2019	The lenders, who sign an inter-creditor agreement (ICA) during the review period	Review of the account within 30 days of default; resolution plan implemented within 180 days from the end of the review period; if not, extra provisions of 20 per cent, 35 per cent in all at 365 days
Enforcement of security interest	Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act	2002	The secured creditor itself, without going to a court	Notice of 60 days to the borrower once the account is an NPA; the borrower may apply to a Debts Recovery Tribunal within 45 days of a measure
Recovery case before a tribunal	Recovery of Debts and Bankruptcy Act	1993	The Debts Recovery Tribunal (DRT)	Its pecuniary limit was raised from Rs 10 lakh to Rs 20 lakh
Corporate insolvency resolution process (CIRP)	Insolvency and Bankruptcy Code (IBC)	2016	The National Company Law Tribunal (NCLT), as the Adjudicating Authority; the creditors vote in a committee of creditors (CoC)	180 days, which may be extended by 90 days; an outer limit of 330 days, including the extension and the time taken in litigation, added by the IBC (Amendment) Act, 2019

- **The SARFAESI Act, 2002** (Act 54 of 2002, enacted on 17 December 2002). Once a secured loan is an NPA and the 60-day notice has run out, the secured creditor may take possession of the secured asset, take over the management of the business, appoint a manager, or ask a person who has acquired the asset to pay the creditor, with no permission from a court. It does not apply to a loan of up to Rs 1 lakh, to agricultural land, or where the amount due is less than 20 per cent of the principal and interest.
- **Asset Reconstruction Companies (ARCs)**, set up under the same Act and registered and regulated by the RBI, take over bad loans from banks and try to recover them.

- **The National Asset Reconstruction Company Ltd (NARCL)** was announced in the Union Budget 2021-22, incorporated on 7 July 2021 and registered with the RBI as an ARC. It buys large stressed loans from banks, paying 15 per cent in cash and 85 per cent in security receipts. In September 2021 the Union Cabinet approved a Central Government guarantee of up to Rs 30,600 crore, valid for five years, for these receipts.
- **The Debts Recovery Tribunal** also hears the borrower's application against a SARFAESI measure. Both Acts have been amended to make recovery more effective.
- **The IBC, 2016** (assent on 28 May 2016). A financial creditor (section 7), an operational creditor (section 9) or the company itself (section 10) may apply to start a CIRP. The minimum default in section 4 is Rs 1 lakh, which the Central Government may raise to not more than Rs 1 crore; the Ministry of Corporate Affairs fixed it at Rs 1 crore on 24 March 2020. A resolution plan needs a CoC vote of not less than 66 per cent of the voting share of the financial creditors (section 30(4)). A moratorium from the start of insolvency stops suits against the company and bars it from selling its assets until the CIRP ends. The Code took control of defaulting companies away from promoters. If no plan is approved, the company goes into liquidation. The Insolvency and Bankruptcy Board of India (IBBI) is the regulator.

2.6 The IBC in figures (IBBI, as on 30 June 2026)

Item	Figure
CIRPs admitted since the Code began	9,166
Closed with a resolution plan approved	1,484
Closed with an order for liquidation	3,074
What creditors realised under resolution plans	30.52 per cent of their admitted claims
Average time taken by the CIRPs that ended in a plan	633 days

- So more than twice as many CIRPs had ended in liquidation as in a resolution plan, and the plans took far longer on average than the 330-day outer limit. (Position at June 2026.)

3. Extra section: the life of a bad loan, from the first missed payment to a loss asset

Take a term loan whose instalment is not paid on the due date, and which stays unpaid.

Stage	When	Class	Provision the bank must make (Master Circular, 1 April 2025)
1	Overdue for up to 30 days	SMA-0, still a standard asset	Only the provision on standard assets, for example 0.40 per cent for most loans

Stage	When	Class	Provision the bank must make (Master Circular, 1 April 2025)
2	Overdue for more than 30 and up to 60 days	SMA-1, still a standard asset	The same
3	Overdue for more than 60 and up to 90 days	SMA-2, still a standard asset	The same
4	Overdue for more than 90 days, and an NPA for up to 12 months	Sub-standard asset	15 per cent of the outstanding; an unsecured exposure needs 10 per cent more, 25 per cent in all
5	After 12 months as a sub-standard asset: doubtful for up to one year	Doubtful asset	100 per cent of the unsecured portion; 25 per cent of the secured portion
6	Doubtful for one to three years	Doubtful asset	100 per cent of the unsecured portion; 40 per cent of the secured portion
7	Doubtful for more than three years	Doubtful asset	100 per cent of the unsecured portion and of the secured portion
Any time	Loss identified by the bank, its auditors or the RBI	Loss asset	It should be written off; if it is kept on the books, 100 per cent of the outstanding

What the table tells us:

- Days decide the SMA classes; months as an NPA decide the NPA classes.
- The provision climbs with age. The secured portion of a doubtful asset goes from 25 to 40 to 100 per cent.
- Two different 25 per cents: a sub-standard exposure that is unsecured needs 25 per cent in all (15 plus 10), while a doubtful asset in its first year needs 25 per cent on its secured portion.
- A loss asset is not a stage reached by age. It can be declared at any time once the loss is identified.
- Paying only the latest instalment does not bring an NPA back to standard: all the arrears must be paid.

4. Three common exam traps

1. **"An NPA is any loan unpaid for 90 days."** For a term loan the test is "more than 90 days", not 90. And other loans have other tests: crop loans are counted in crop seasons (two for short duration crops, one for long duration crops), an overdraft or cash credit account must be "out of order", and a credit card account turns NPA when the minimum amount due is not paid within 90 days from the payment due date.
2. **"Only the loan in default becomes an NPA, and one payment cures it."** Classification is borrower-wise: all the facilities of that borrower with the bank become NPAs. And the account goes back to standard only when the entire arrears of interest and principal are paid.
3. **Two different "180 days".** Under the IBC the CIRP has 180 days, which may be extended by 90 days, within an outer limit of 330 days that includes the time taken in litigation. Under the RBI's 2019 framework, the 180 days for implementing a plan are counted from the end of the review period, not from the date of default.

Topic 315

Major ports of India

1. Concept in one line

A major port is a port that the Union declares to be one by law and runs through a Major Port Authority (Kamarajar Port is run as a company), and the Ministry of Ports, Shipping and Waterways counted 14 such ports, 12 of them operational, as on 7 November 2026. Revision focus: where each major port lies, its former name, the law and the constitutional entry behind it, and the dated figures of cargo.

2. Revision notes

Andhra Pradesh: Visakhapatnam is the State's only major port; it handled 91.17 million tonnes (MT) in 2025-26 (advance estimates), fourth among the major ports, and every other port of the State is a non-major port under the Andhra Pradesh Maritime Board.

2.1 Major and non-major ports: the Constitution and the law

Point	Major port	Non-major port
Entry in the Seventh Schedule	Union List, Entry 27: "Ports declared by or under law made by Parliament or existing law to be major ports, including their delimitation, and the constitution and powers of port authorities therein."	Concurrent List, Entry 31: "Ports other than those declared by or under law made by Parliament or existing law to be major ports."
Who controls it	The Union, through the Ministry of Ports, Shipping and Waterways	The State Maritime Board or the State Government
Law for its management	The Major Port Authorities Act, 2021	The Indian Ports Act, 2025, in force from 1 April 2026
Number (Ministry, as on 7 November 2026)	14, of which 12 are operational	About 200, of which around 65 handle cargo

- Many guidebooks say that non-major ports are a State subject. The text of the Constitution puts them in the Concurrent List (Entry 31), not in the State List. If a question quotes the Seventh Schedule, follow the text.
- The Ministry also calls non-major ports "minor ports". Most of the 200 that do not handle cargo are "Port Limits" used mainly by fishing vessels and small ferries.

2.2 The Major Port Authorities Act, 2021

- The Act provides for the regulation, operation and planning of major ports. It came into force on 3 November 2021, and the Major Port Trusts Act, 1963 stands repealed.
- Each major port is now run by a Major Port Authority. Its administration, control and management are vested in the Board of that Authority.
- **The Board, in a line (section 3(1) of the Act):** a chairperson, a deputy chairperson, one member each from the State Government, the Ministry of Railways, the Ministry of Defence and Customs, two to four independent members, one ex officio member nominated by the Centre and two members representing the employees. The Centre appoints the chairperson and the deputy chairperson on the recommendation of a selection committee.
- The Board, or its committees, fixes the rates of the port, a task done earlier by the Tariff Authority for Major Ports. An Adjudicatory Board set up by the Centre takes the place of that Tariff Authority.
- Parliament passed the Bill in two steps: the Lok Sabha on 23 September 2020 and the Rajya Sabha on 10 February 2021.

2.3 Kamarajar: the major port run as a company

- The Ministry lists the 12 operational major ports as 11 Port Authorities and one company, Kamarajar Port Limited.
- The port was incorporated as Ennore Port Limited under the Companies Act, 1956 in October 1999. It was commissioned on 1 February 2001, and commercial work began on 22 June 2001 with the unloading of thermal coal. It was planned mainly to handle thermal coal for power stations in Tamil Nadu (the port's website).
- The port calls itself "the first corporatized Major Port in the country" and "A Company of Chennai Port Authority". It is an artificial harbour protected by two breakwaters (the port's website).

2.4 Four renamed major ports

Old name	New name	Date	Date distinction
Tuticorin Port Trust	V.O. Chidambaranar Port Trust	27 January 2011	The Union Cabinet approved the renaming; the port's Administration Report 2024-25 records the change of name on 11 February 2011
Ennore Port Limited	Kamarajar Port Limited	25 February 2014	The Registrar of Companies, Chennai issued a fresh certificate of incorporation in the new name (the company's annual report 2013-14)

Old name	New name	Date	Date distinction
Kandla Port Trust	Deendayal Port Trust	25 September 2017	A notification under the Indian Ports Act, 1908 replaced "Kandla" with "Deendayal"
Kolkata Port	Syama Prasad Mookerjee Port, Kolkata	24 June 2020	Gazette notification S.O. 2020(E), after the Cabinet's approval announced on 3 June 2020

- V.O. Chidambaranar Pillai (1872 to 1936) was from Ottapidaram, near Tuticorin. He founded the Swadeshi Steam Navigation Company, and in 1906 he started an indigenous shipping service, between Tuticorin and Colombo.
- The Kandla notification marked the close of the centenary celebrations of Pandit Deendayal Upadhyay.
- Under the 2021 Act the Port Trusts became Port Authorities, so today's names end in "Port Authority" (for example, Deendayal Port Authority).

2.5 The major ports, from west to east

Port	State	Coast	Former name	A feature (key feature)
Deendayal	Gujarat	West	Kandla	On the Gulf of Kutch; first in cargo in 2025-26
Mumbai	Maharashtra	West	None	Fifth in cargo in 2025-26
Jawaharlal Nehru	Maharashtra	West	None	Third in cargo in 2025-26; with the Maharashtra Maritime Board it proposed the Vadhavan port (Lok Sabha answer, 27 June 2019)
Mormugao	Goa	West	None	The highest growth of cargo in 2025-26 (14.96 per cent), but the smallest cargo of the 12
New Mangalore	Karnataka	West	None	50.05 MT in 2025-26
Cochin	Kerala	West	None	The lowest growth of cargo in 2025-26 (0.84 per cent)

Port	State	Coast	Former name	A feature (key feature)
V.O. Chidambaranar	Tamil Nadu	East (Gulf of Mannar)	Tuticorin	Named after V.O. Chidambaranar Pillai
Chennai	Tamil Nadu	East	None	Kamarajar Port Limited is "A Company of Chennai Port Authority"
Kamarajar	Tamil Nadu	East	Ennore	Incorporated as a company in October 1999
Visakhapatnam	Andhra Pradesh	East	None	Inner harbour built by the Bengal Nagpur Railway between 1927 and 1933
Paradip	Odisha	East	None	Second in cargo in 2025-26
Syama Prasad Mookerjee	West Bengal	East	Kolkata	India’s first major port and its only riverine major port; it came under a Trust on 17 October 1870

- **Syama Prasad Mookerjee Port** reports its cargo in two parts, the Kolkata Dock System and the Haldia Dock Complex, which the Ministry's table adds up into one port total.
- “None” indicates that no earlier name is listed in this comparison.
- Tamil Nadu has three major ports and Maharashtra two. Every other State in the table has one. The west coast has six operational major ports and the east coast six.

The two major ports that are not yet operational. Galathea Bay and Vadhavan have been notified as major ports but are not yet operational:

- **Galathea Bay**, an international transshipment port planned in Great Nicobar Island (Andaman and Nicobar Islands). It was notified as a major port in 2024, with that status reiterated in August 2025.
- **Vadhavan**, near Dahanu in Palghar district, Maharashtra. A Gazette notification of 19 February 2020 (S.O. 758(E)), issued under the Indian Ports Act, 1908, declared Vadhavan Port a major port "with immediate effect". The Union Cabinet approved the project on 19 June 2024 at an estimated cost of Rs 76,220 crore, and the Prime Minister laid its foundation stone on 30 August 2024. Phase I is expected by 2030 (the Minister, August 2025).

2.6 Cargo and rank, 2025-26

Cargo data: 2025-26 figures are advance estimates; 2024-25 figures are provisional.

Rank	Port	Cargo in 2025-26 (MT)	Share of major-port cargo (per cent)	Growth over 2024-25 (per cent)
1	Deendayal	160.11	17.50	6.63
2	Paradip	156.45	17.10	4.02
3	Jawaharlal Nehru	102.01	11.15	10.74
4	Visakhapatnam	91.17	9.97	10.34
5	Mumbai	75.15	8.22	9.50
12	Mormugao	20.84	2.28	14.96
Total	All 12 major ports	914.73	100.00	7.00

- In 2024-25 the 12 handled 854.86 MT (provisional).
- Of the 2025-26 total, overseas cargo was 76.67 per cent and coastal cargo 23.33 per cent.
- Deendayal and Paradip are close at the top. Learn the order with its year and its basis (advance estimates).

2.7 Policy in brief

- **Sagarmala:** the Union Cabinet approved the concept on 25 March 2015. It aims to promote port-led development, through five components: coastal shipping and inland water transport, port modernisation, port connectivity, port-led industrialisation and coastal community development.
- **Maritime India Vision 2030:** a roadmap launched in 2021, with over 150 initiatives and a projected investment of Rs 3 to 3.5 lakh crore across ports, shipping and inland waterways.
- **Maritime Amrit Kaal Vision 2047:** released by the Prime Minister in 2023, with more than 300 initiatives and an investment of nearly Rs 80 lakh crore.

3. Extra section: chronology of the major-port system

Date	Event
17 October 1870	The port at Kolkata comes under a Trust
1927 to 1933	The inner harbour at Visakhapatnam is built
1963	The Major Port Trusts Act is passed
October 1999	Ennore Port Limited is incorporated under the Companies Act, 1956

Date	Event
22 June 2001	Commercial work begins at Ennore with thermal coal
27 January 2011	The Cabinet approves renaming Tuticorin Port Trust as V.O. Chidambaranar Port Trust
25 February 2014	Ennore Port Limited becomes Kamarajar Port Limited
25 March 2015	The Cabinet approves the Sagarmala concept
25 September 2017	Kandla Port Trust becomes Deendayal Port Trust
19 February 2020	A Gazette notification declares Vadhavan Port a major port
24 June 2020	Gazette notification renames Kolkata Port as Syama Prasad Mookerjee Port, Kolkata
2021	Maritime India Vision 2030 is launched
10 February 2021	The Rajya Sabha passes the Major Port Authorities Bill
3 November 2021	The Major Port Authorities Act, 2021 comes into force; the 1963 Act stands repealed
2023	Maritime Amrit Kaal Vision 2047 is released
19 June 2024	The Union Cabinet approves the Vadhavan port project
30 August 2024	Foundation stone of Vadhavan port
2025-26	The 12 operational major ports handle 914.73 MT (advance estimates)
7 November 2026	The Ministry counts 14 major ports, 12 of them operational

4. Three common exam traps

1. **"India has 12 major ports" or "India has 13".** The count as on 7 November 2026 is 14, of which 12 are operational. The cargo table counts only the 12 that work. Galathea Bay and Vadhavan have both been notified as major ports, but neither is operating yet. Do not confuse these counts with the roughly 200 non-major ports, of which about 65 handle cargo.
2. **"The biggest major port is Mumbai."** By cargo in 2025-26 (advance estimates), Deendayal came first. Mumbai was only fifth, behind Visakhapatnam. Learn the ranks with the year and the basis, because the leading ports are close and advance estimates are later revised into final figures.
3. **Mixing up the two visions.** Maritime India Vision 2030 came first, in 2021, with over 150 initiatives. Maritime Amrit Kaal Vision 2047 followed in 2023, with more than 300 initiatives. Sagarmala is older than both (2015) and is a pillar of both.

Topic 316

Rural and urban population: definitions and India-AP comparisons

1. Concept in one line

The Census of India counts a place as urban if it is a statutory town or a census town and treats every other place as rural, and by the provisional figures of 2011 about 31 per cent of India's people lived in urban areas. Revision focus: these definitions, the 2011 rural and urban figures for India and Andhra Pradesh on the right base, and the rapid rise of census towns between 2001 and 2011.

2. Revision notes

2.1 Essential background

- India's 2011 population is (1,210,854,977 final; 1,210,193,422 provisional) with a provisional urban share of 31.16 per cent.
- Census concepts include: statutory town, census town, outgrowth, urban agglomeration and city, and a 2011 figure belongs to the boundaries of 2011.
- The 74th Amendment added Part IXA and the three kinds of Municipality under Article 243Q.
- Andhra Pradesh's 2011 population has two bases: 84,580,777 for the undivided State and 4,95,77,103 recast for the present State.

2.2 Urban and rural: the Census definitions

The Census uses two units: "the unit of classification in this regard is 'town' for urban areas and 'village' for rural areas." Every place is one or the other.

Term	Census definition	Example (illustration)
Urban area	Two kinds: statutory towns, and other places that pass three tests (census towns)	Both kinds below
Statutory town	A place with a municipality, corporation, cantonment board or notified town area committee. It is notified under law by the State or Union territory government and is urban whatever its population	A small cantonment governed by a cantonment board is urban even with fewer than 5,000 people

Term	Census definition	Example (illustration)
Census town	A place without such a body that has all three: (a) a population of at least 5,000; (b) at least 75 per cent of the male main working population in non-agricultural pursuits; (c) a density of at least 400 persons per sq km	A large village with a gram panchayat, 6,000 people, 450 persons per sq km and 80 per cent of its male main workers outside farming
Outgrowth (OG)	An urban spread near a city or statutory town, outside its statutory limits but within the revenue limits of a contiguous village	The Census's own examples: "railway colonies, university campuses, port areas, etc."
Urban agglomeration (UA)	"a continuous urban spread constituting a town and its adjoining urban outgrowths (OGs) or two or more physically contiguous towns together and any adjoining urban outgrowths of such towns." For 2011 it must contain at least one statutory town and at least 20,000 people as per the previous Census	A municipal town together with the railway colony just outside its limits
Rural area	Every place that is not a town; its unit is the village	A village with a gram panchayat that fails even one of the three tests

Points to keep:

- **The three tests are joint.** The Census's words are "satisfying the following three criteria simultaneously". A place that passes two tests and fails the third stays rural.
- **"Male main working population".** The 2011 test counts the male main working population. The Census's 2001 wording said only "male working population". Women workers are not counted in this test.
- **When the lists were fixed.** For 2011, statutory towns were taken as on 31 December 2009. Census towns were identified from the data of the previous Census, that of 2001. Census towns selected using the earlier Census are not declassified solely because they fail the criteria in the new Census. So a place picked as a census town from the 2001 data was not dropped from the 2011 list when the 2011 data showed it failing a test.
- **Census status is not municipal status.** Article 243Q leaves it to the Governor to specify a transitional, smaller or larger urban area. The Census does not create a municipality when it counts a census town as urban. A growing share of the urban population lives in census towns governed under the rural administrative framework.

2.3 India in 2011: rural and urban

The Census's rural-urban paper of 2011 (Provisional Population Totals, Paper 2) gives these figures. They are provisional: they add up to the provisional total of 1,210,193,422, not the final 1,210,854,977.

- **Rural population:** 833,087,662 (68.84 per cent).
- **Urban population:** 377,105,760 (31.16 per cent, up from 27.81 per cent in 2001).
- **Decadal growth, 2001-11:** urban 31.80 per cent, rural 12.18 per cent, total 17.64 per cent. The final total growth is 17.7 per cent; do not mix the two.
- **Towns:** 7,935 in 2011 against 5,161 in 2001: 4,041 statutory towns and 3,894 census towns (Section 3).
- In 2001 India had 286.11 million urban people in 5,161 towns (Ministry of Urban Development, 2013).
- So in 2011 roughly two out of three Indians still lived in rural areas, but the urban population was growing well over twice as fast.

2.4 India and Andhra Pradesh compared

Measure	India	Andhra Pradesh	Year	Base	Data basis
Urban share	31.16 per cent	33.49 per cent	2011	Provisional; undivided State	Census 2011, Paper 2
Urban share	31.16 per cent	29.47 per cent	2011	AP recast for the present State	AP Socio-Economic Survey 2018-19 and 2024-25
Urban share	27.81 per cent	27.30 per cent	2001	Undivided State	Census 2011, Paper 2
Urban share	27.81 per cent	24.13 per cent	2001	AP recast for the present State	AP Socio-Economic Survey 2018-19 and 2024-25
Rural population	833,087,662	56,311,788	2011	Provisional; undivided State	Census 2011, Paper 2
Urban population	377,105,760	28,353,745	2011	Provisional; undivided State	Census 2011, Paper 2
Rural decadal growth	12.18 per cent	1.64 per cent	2001-11	Provisional; undivided State	Census 2011, Paper 2
Urban decadal growth	31.80 per cent	36.26 per cent	2001-11	Provisional; undivided State	Census 2011, Paper 2

The caution about Andhra Pradesh's two bases:

- The Census of 2011 was taken before the State was divided in 2014. Its "Andhra Pradesh" is the undivided State. In the provisional paper that State had 84,665,533 people; the final figure is 84,580,777 (Topics 145, 275).
- The present State's figures are recast: the 2011 data of the areas that now form Andhra Pradesh, 4,95,77,103 people in all. The State's Socio-Economic Survey gives its urban share on this base. The State's Census 2011 table (Commissionerate of School Education) gives the same base: 1,46,10,410 urban people out of 4,95,77,103, or 29.47 per cent.
- So "Andhra Pradesh's urban share in 2011" has two correct answers, and they fall on opposite sides of India's 31.16 per cent: the undivided State was above it, the present State below it. Always ask which State and which base.
- The two States are not the same areas, so the gap between 33.49 and 29.47 is not a change over time. Both figures describe 2011.
- **Growth in the undivided State:** its rural population barely grew in 2001-11, while its urban population grew faster than India's.
- **No newer count:** the Socio-Economic Survey 2024-25 still gives the 2011 Census share of 29.47 per cent for the present State, as the 2018-19 Survey did, and no newer estimate. A new count of rural and urban population must wait for Census 2027.
- Within the State, Visakhapatnam was the most urbanised district of 2011 and Srikakulam the least.

2.5 The rural-urban contrast

Measure	India rural	India urban	AP rural	AP urban	Base
Literacy rate, final (per cent)	67.8	84.1	60.4	80.1	Census 2011; AP undivided
Literacy rate, provisional (per cent)	68.91	84.98	61.14	80.54	Census 2011, Paper 2; AP undivided
Sex ratio, females per 1,000 males	949	929	—	—	Census 2011 (MoSPI)
Child sex ratio, 0-6 years, provisional	919	902	942	946	Census 2011, Paper 2; AP undivided

- **Literacy:** urban areas lead in both. On the final figures the gap is 16.3 points for India and 19.7 points for the undivided State.
- **Sex ratio:** in India the urban sex ratio (929) is lower than the rural (949). The child sex ratio is also lower in urban India (902 against 919).
- **Andhra Pradesh differs on the child sex ratio:** in the undivided State the urban figure (946) was a little above the rural (942).

- **Present State:** the Socio-Economic Survey gives only the totals for 2011: a sex ratio of 997 (India 943) and a literacy rate of 67.35 per cent (India 72.98). Keep these apart from the undivided State's rural and urban figures in the table.

2.6 Census 2027

- The reference date for most of the country is 00:00 hours of 1 March 2027 (Gazette notification S.O. 4919(E) of 5 September 2026;).
- The first phase, Houselisting and Housing Census, was scheduled for April to September 2026. On 12 August 2026 the Ministry of Home Affairs told the Rajya Sabha that it had been completed in 31 States and Union territories and was scheduled to be completed in the rest by September 2026. According to news reports of 30 October 2026, it was later deferred in Manipur.
- Its rural-urban figures will be the first to count the present State of Andhra Pradesh on its own.

3. Extra section: the rise of census towns, 2001 to 2011

Kind of town	2001	2011	Increase
Statutory towns	3,799	4,041	242
Census towns	1,362	3,894	2,532
All towns	5,161	7,935	2,774

What the numbers show:

- Census towns nearly tripled (2.86 times), while statutory towns grew by only about 6 per cent.
- Of the 2,774 extra towns, 2,532 (about 91 per cent) were census towns.
- Census towns were about a quarter of all towns in 2001 (26 per cent) and about half in 2011 (49 per cent). Statutory towns were still slightly more numerous in 2011.
- These are the counts of the provisional release of 2011. Government statements of 2016 give the same 4,041 statutory towns and slightly lower counts of census towns (3,892 in a Rajya Sabha answer; 3,784 in a Ministry of Urban Development release). On every count, statutory towns stay more numerous.

Working out the absolute increase from the Census's own figures:

- Urban: 377,105,760 grew by 31.80 per cent in the decade, so the increase was 377,105,760 × 31.80 ÷ 131.80, about 91.0 million. This matches the 286.11 million urban people of 2001.
- Rural: 833,087,662 grew by 12.18 per cent, so the increase was 833,087,662 × 12.18 ÷ 112.18, about 90.5 million.
- So, on the provisional figures, India added slightly more people to its towns than to its villages in 2001-11. The Registrar General, releasing these provisional figures in 2011, said that this happened for the first time since Independence. The margin is only about half a million, so quote this point with the provisional set.

What it means, as Kanhu Charan Pradhan ("Unacknowledged Urbanisation: New Census Towns of India", *Economic and Political Weekly*, 7 September 2013) explains it:

- Much of India's new urban growth came from places being reclassified as urban, not only from cities swelling.
- By his base estimate, the new census towns accounted for about 29.5 per cent of the growth of the urban population in 2001-11.
- He finds that urbanisation through reclassification was larger than urbanisation through migration, which he calls unusual.
- These census towns are urban in the Census but are still governed as rural areas, so he argues that they need proper governance arrangements for their future growth.

4. Three common exam traps

1. **Mixing provisional and final figures.** The rural and urban counts of Paper 2 add up to the provisional total of 1,210,193,422, not to the final total of 1,210,854,977, and the urban share of 31.16 per cent is worked out on that provisional total. In the same way, the undivided State's provisional population was 84,665,533 and its final population 84,580,777; its provisional total growth was 11.10 per cent and its final growth 11.0 per cent. Quote a figure with the set it comes from.
2. **Asking "Andhra Pradesh" without asking "which one".** A 2011 figure for "Andhra Pradesh" from the Census itself is for the undivided State of about 8.46 crore people. A figure from the State's Socio-Economic Survey is usually recast for the present State of about 4.96 crore. The two can give opposite answers to the same comparison with India, and the gap between them is a gap in area, not a change over time.
3. **Thinking a census town is a municipal town.** A census town is urban only in the Census count. It has no municipality; the Governor, not the Census, specifies urban areas under Article 243Q. An outgrowth, too, is not a town by itself: it is counted as part of an urban agglomeration with the town it adjoins.

Topic 317

CSIR and its laboratories

1. Concept in one line

The Council of Scientific and Industrial Research (CSIR) is a registered society under the Department of Scientific and Industrial Research (DSIR) of the Ministry of Science and Technology, and it runs a network of national laboratories spread across India. Revision focus: its origin and legal status, who heads it, which laboratory is in which city and works in which field, and its missions and awards.

2. Revision notes

2.1 What CSIR is

Point	Fact (as on 7 November 2026)
Full name	Council of Scientific and Industrial Research
Origin	Registered as a society on 12 March 1942; the Government Resolution on CSIR is dated 26 September 1942
Legal status	A society registered under the Societies Registration Act (XXI of 1860)
President	The Prime Minister, ex officio (Narendra Modi, position recorded 7 November 2026)
Vice-President	The Minister in charge of the ministry or department that deals with CSIR, ex officio (Dr Jitendra Singh, position recorded 7 November 2026)
Director-General	The principal executive officer of the society; Dr N. Kalaiselvi (position recorded 7 November 2026), Director-General, CSIR and Secretary, DSIR
Parent department	DSIR, Ministry of Science and Technology
Headquarters	Anusandhan Bhawan, 2 Rafi Ahmed Kidwai Marg, New Delhi
Network	37 national laboratories, 39 outreach centres, 1 innovation complex and 3 units with pan-India presence

- "Ex officio" means by virtue of the office: whoever holds the office holds the CSIR post.
- CSIR's parent is DSIR, not the Department of Science and Technology (DST).

2.2 Origin and governance

- **Before CSIR:** a Board of Scientific and Industrial Research (BSIR) was created on 1 April 1940, and Shanti Swarup Bhatnagar was appointed its Director. He is called the founder Director of CSIR.
- **Two dates of 1942:** registration under the Societies Registration Act: 12 March 1942. Government Resolution and establishment date: 26 September 1942. Registration and establishment are distinct events.
- **Governance under the bye-laws:** the Prime Minister is the ex officio President of the society. The Minister in charge of the ministry or department dealing with CSIR is the ex officio Vice-President. The Director-General is the principal executive officer and also the ex officio Secretary of the society. A Governing Body administers, directs and controls the affairs and funds of the society.
- **Director-General:** N. Kalaiselvi took charge in August 2022; she was listed as Director-General, CSIR and Secretary, DSIR on 7 November 2026.

2.3 Vision and mission

CSIR’s vision and mission:

- **Vision:** to raise the quality of life of India's citizens through innovative science and technology and globally competitive research and development, by building sustainable solutions and capacity to fulfil the dream of Atmanirbhar Bharat.
- **Mission:** thirteen points. Among them: technology innovation, translational research and commercialisation linked to national goals; design and development of small and medium civil aircraft; scalable green energy technologies; globally benchmarked sustainable chemical processes that reduce the trade deficit; sustainable agriculture and nutritional security through biotechnology; and technologies for carbon neutrality and net zero in industry.

2.4 The size of the network (as on 7 November 2026)

- CSIR has **37 national laboratories, 39 outreach centres, 1 innovation complex and three units** with pan-India presence.
- The innovation complex is the CSIR-Innovation Complex Mumbai. CSIR's network map also lists bodies that are not laboratories, such as the Academy of Scientific and Innovative Research (AcSIR), Ghaziabad, the Traditional Knowledge Digital Library (TKDL), New Delhi, and the Unit for Research and Development of Information Products (URDIP), Pune, which CSIR's directory calls a unit.
- CSIR's network map sorts its entries into five clusters: biological sciences, chemical sciences, engineering sciences, information sciences and physical sciences.

2.5 The laboratories by field

The table lists the 37 laboratories on CSIR's network map, in the five clusters to which the map assigns them, with the cities the map gives. The map's other entries, such as AcSIR, TKDL and URDIP, are filed by the map as units and are left out.

CSIR cluster (number of laboratories)	Laboratories and their cities
Biological sciences (11)	Centre for Cellular and Molecular Biology (CCMB), Hyderabad; Central Drug Research Institute (CDRI), Lucknow; Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow; Central Food Technological Research Institute (CFTRI), Mysuru; Institute of Genomics and Integrative Biology (IGIB), Delhi; Institute of Himalayan Bioresource Technology (IHBT), Palampur; Indian Institute of Chemical Biology (IICB), Kolkata; Indian Institute of Integrative Medicine (IIIM), Jammu; Institute of Microbial Technology (IMTECH), Chandigarh; Indian Institute of Toxicology Research (IITR), Lucknow; National Botanical Research Institute (NBRI), Lucknow
Chemical sciences (9)	Central Electrochemical Research Institute (CECRI), Karaikudi; Central Leather Research Institute (CLRI), Chennai; Central Institute of Mining and Fuel Research (CIMFR), Dhanbad; Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar; Indian Institute of Chemical Technology (IICT), Hyderabad; Indian Institute of Petroleum (IIP), Dehradun; National Chemical Laboratory (NCL), Pune; North-East Institute of Science and Technology (NEIST), Jorhat; National Institute for Interdisciplinary Science and Technology (NIIST), Thiruvananthapuram
Engineering sciences (10)	Advanced Materials and Processes Research Institute (AMPRI), Bhopal; Central Building Research Institute (CBRI), Roorkee; Central Glass and Ceramic Research Institute (CGCRI), Kolkata; Central Mechanical Engineering Research Institute (CMERI), Durgapur; Central Road Research Institute (CRRI), New Delhi; Institute of Minerals and Materials Technology (IMMT), Bhubaneswar; National Aerospace Laboratories (NAL), Bengaluru; National Environmental Engineering Research Institute (NEERI), Nagpur; National Metallurgical Laboratory (NML), Jamshedpur; Structural Engineering Research Centre (SERC), Chennai
Information sciences (2)	National Institute of Science Communication and Policy Research (NISCPR), New Delhi; National Institute of Data Science and Artificial Intelligence (formerly CSIR-4PI), Bengaluru
Physical sciences (5)	Central Electronics Engineering Research Institute (CEERI), Pilani; Central Scientific Instruments Organisation (CSIO), Chandigarh; National Geophysical Research Institute (NGRI), Hyderabad; National Institute of Oceanography (NIO), Goa; National Physical Laboratory (NPL), New Delhi

2.6 Cities that need care

- **Several laboratories in one city:** Hyderabad has three (CCMB, IICT, NGRI). Lucknow has four (CDRI, CIMAP, NBRI, IITR). Chandigarh has two: CSIO, the instruments laboratory, and IMTECH, the microbial technology laboratory. Chennai has two (CLRI and SERC), Kolkata two (IICB and CGCRI), and New Delhi three (NPL, CRRI and NISCPR).
- **Mining and mechanical engineering:** the mining and fuel laboratory (CIMFR) is at Dhanbad; the mechanical engineering laboratory (CMERI) is at Durgapur; the metallurgy laboratory (NML) is at Jamshedpur.
- **NPL, New Delhi:** it is the National Metrology Institute (NMI) of India. Its mandate is to develop measurement and calibration standards that are internationally accepted. CSIR-NPL maintains Indian Standard Time (IST).

2.7 Andhra Pradesh and Hyderabad

- CSIR's three Hyderabad laboratories are CCMB (cellular and molecular biology), IICT (chemical technology) and NGRI (geophysics). Hyderabad is in Telangana.
- None of the 37 laboratories on CSIR's network map is located in Andhra Pradesh (as on 7 November 2026).
- Hyderabad also has DRDO laboratories (DRDL, RCI, ASL and DMRL;). These belong to the Ministry of Defence, not to CSIR.

2.8 Missions and achievements

Mission or achievement	What it is	Date and authority
Aroma Mission, Phase I	Launched by the Union Ministry of Science and Technology. In Phase I, CSIR helped cultivation on 6,000 hectares, covered 46 Aspirational districts and trained more than 44,000 persons	Position: 16 January 2022
Aroma Mission, Phase II	Launched after Phase I. It proposed to engage over 45,000 skilled human resources and benefit more than 75,000 farming families. CSIR-IHBT, CSIR-CIMAP, CSIR-NBRI and CSIR-NEIST take part in Phase II along with CSIR-IIIM	Position: 16 January 2022
Lavender in Jammu and Kashmir	CSIR-IIIM, Jammu, introduced lavender (its variety RRL-12), gave more than 30 lakh free lavender plants and installed 50 distillation units (45 fixed and 5 mobile). More than 2,500 farmers grow lavender in Jammu and Kashmir. The media call this the "Purple Revolution"	Position: 4 June 2023

Mission or achievement	What it is	Date and authority
Bhaderwah	The Union Minister said that "Bhaderwah has emerged as the Lavender capital of India". Lavender oil output there rose from 300 litres in 2019 to 1,500 litres in 2022	Position: 4 June 2023
Rural development award	CSIR-IIIM received the CSIR award for S&T innovations for rural development (CAIRD-2020) for its lavender work	Position: 4 June 2023
- The Aroma Mission is a flagship CSIR project promoting aromatic crops, including lavender. Its aim is to raise the income of small and marginal farmers and to develop agriculture-based start-ups.		

2.9 The Shanti Swarup Bhatnagar Prize, in a line

The prize, named after CSIR's founder Director, covered seven fields of science and was awarded from 1958. On 21 September 2023 the Ministry of Science and Technology announced the Rashtriya Vigyan Puraskar, whose four categories are Vigyan Ratna, Vigyan Shri, Vigyan Yuva-Shanti Swarup Bhatnagar (for young scientists up to the age of 45) and Vigyan Team, in 13 domains.

2.10 Neighbouring topics, a line each

- DRDO : the research and development wing of the Ministry of Defence, formed in 1958, with around 41 laboratories and 5 Young Scientist Laboratories (position recorded 17 October 2026).

3. Extra section: CSIR in date order

Date	Event
1 April 1940	Board of Scientific and Industrial Research created, with Shanti Swarup Bhatnagar as Director
12 March 1942	CSIR registered as a society under the Societies Registration Act (XXI of 1860)
26 September 1942	Government Resolution on CSIR; CSIR established
1958	Shanti Swarup Bhatnagar Prize first given by CSIR
2019 to 2022	Lavender oil output at Bhaderwah rises from 300 litres to 1,500 litres

Date	Event
By 16 January 2022	Aroma Mission Phase I completed (6,000 hectares, 46 Aspirational districts); Phase II launched
August 2022	N. Kalaiselvi becomes Director-General of CSIR
4 June 2023	Bhaderwah called the "Lavender capital of India"
21 September 2023	Rashtriya Vigyan Puraskar announced, with a Vigyan Yuva-Shanti Swarup Bhatnagar category
7 November 2026	CSIR gives 37 national laboratories and 39 outreach centres

4. Three common exam traps

1. **Counting.** CSIR gives 37 national laboratories and 39 outreach centres (as on 7 November 2026). Do not swap the two figures. DRDO's "around 41 laboratories" belongs to a different organisation, under the Ministry of Defence.
2. **Look-alike "National" laboratories.** NAL is the aerospace laboratory at Bengaluru; NML is the metallurgy laboratory at Jamshedpur; NCL is the chemistry laboratory at Pune; NBRI is the botanical laboratory at Lucknow; NEERI is the environmental engineering laboratory at Nagpur. One changed letter moves a laboratory to another city and another field.
3. **CSIR or DRDO in Hyderabad.** CCMB, IICT and NGRI are CSIR laboratories, under DSIR in the Ministry of Science and Technology. DRDL, RCI, ASL and DMRL are DRDO laboratories, under the Ministry of Defence. A question that puts IICT under DRDO, or DRDL under CSIR, is wrong.

Topic 318

Numerical Venn diagrams: two- and three-set inclusion-exclusion

1. Concept in one line

A numerical Venn diagram question gives the number of members in two or three groups and in some of their overlaps, and asks for the number in one region, or for the least or greatest possible overlap. The standard aptitude method answers it with the inclusion-exclusion formula, by filling the diagram from the centre outwards, and with two limits on the overlap of two groups.

2. Revision notes

2.1 Recall from Topics 8 and 168, and what is new

- Circles show how groups are related (one inside another, partly overlapping, or separate); the size of a circle says nothing about how many members the group has.
- Two overlapping circles make 4 regions and three make 8; each phrase ("only A", "exactly two", "at least one", "none") names fixed regions; the two- and three-set formulas; filling a diagram from the centre. Use region numbers 1 to 8 consistently as shown below.
- Topics 29 and 159: a percentage is a fraction with denominator 100; x% of y = (x/100) × y. This is used in 2.7.
- Methods covered: why each step of the method works, how to find the centre when it is not given, how to check that the data are possible, the least and greatest overlap of two groups, and percentage versions.

2.2 Two groups: the formula, "only" and "neither"

The diagram in words. A rectangle stands for everyone counted, the universal set U, with n(U) members. Inside it, two circles A and B partly overlap. They make four regions: only A (inside A, outside B), both A and B (the common part), only B, and neither (inside the rectangle, outside both circles). Write n(X) for the number of members of X.

- **Union:** n(A ∪ B) = n(A) + n(B) - n(A ∩ B). Why: adding n(A) and n(B) counts each member of the common part twice, once in each circle. Subtracting n(A ∩ B) once leaves every member counted once.
- **Only A** = n(A) - n(A ∩ B), because circle A is made of "only A" and the common part. In the same way, only B = n(B) - n(A ∩ B).
- **Neither** = n(U) - n(A ∪ B), because the four regions together fill the rectangle.
- **Working backwards.** The five numbers n(U), n(A), n(B), n(A ∩ B) and "neither" are tied by one equation: n(U) = n(A) + n(B) - n(A ∩ B) + neither. Any four of them give the fifth.

Example: of 75 farmers, 48 grow chillies, 39 grow turmeric and 21 grow both. At least one crop = 48 + 39 - 21 = 66; neither = 75 - 66 = 9; only chillies = 48 - 21 = 27; only turmeric = 39 - 21 = 18.

2.3 Three groups: the formula, and why the centre is added back

The diagram in words : inside the rectangle, circle A at the top left, B at the top right and C below, each cutting the other two. The part common to all three is the centre. Around it lie three parts, each common to two circles only. Each circle also has an outer part of its own. The space outside all three circles is the eighth region.

$n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(C \cap A) + n(A \cap B \cap C)$

Why each step is needed:

1. **Add the three group totals.** A member of exactly one group is counted once; a member of exactly two groups, twice; a member of all three, three times.
2. **Subtract the three pair totals.** A member of exactly two groups is in one pair total, so the count falls from 2 to 1. A member of all three is in all three pair totals, so the count falls from 3 to 0: the centre has now dropped out.
3. **Add the centre back once.** Now every member inside the circles is counted exactly once.

- A **pair total**, such as "20 like both tea and coffee", means everyone in both groups, including those in all three. It is the "two but not the third" region plus the centre.
- None = $n(U) - n(A \cup B \cup C)$.

2.4 The eight regions, and formulas for "exactly one", "exactly two" and "at least two"

The region numbers and names are used consistently below.

Region	Name in words	Found from the totals as
1	Only A	$n(A) - n(A \cap B) - n(C \cap A) + n(A \cap B \cap C)$
2	Only B	$n(B) - n(A \cap B) - n(B \cap C) + n(A \cap B \cap C)$
3	Only C	$n(C) - n(B \cap C) - n(C \cap A) + n(A \cap B \cap C)$
4	A and B but not C	$n(A \cap B) - n(A \cap B \cap C)$
5	B and C but not A	$n(B \cap C) - n(A \cap B \cap C)$
6	C and A but not B	$n(C \cap A) - n(A \cap B \cap C)$
7	All three (the centre)	$n(A \cap B \cap C)$

Region	Name in words	Found from the totals as
8	None (outside all three circles)	n(U) - n(A ∪ B ∪ C)

- Why "only A" adds the centre back: n(A) - n(A ∩ B) - n(C ∩ A) takes the centre out twice, but it is inside A only once.

Write S1 for the sum of the three group totals, S2 for the sum of the three pair totals, and S3 for n(A ∩ B ∩ C).

Phrase	Regions	Formula	Why
Exactly two	4, 5 and 6	S2 - 3 × S3	Each pair total holds the centre once, so S2 holds it three times
At least two	4, 5, 6 and 7	S2 - 2 × S3	Exactly two, plus the centre once
Exactly one	1, 2 and 3	S1 - 2 × S2 + 3 × S3	S1 counts regions 4 to 6 twice and region 7 three times; take away 2 × (exactly two) and 3 × S3
At least one	1 to 7	S1 - S2 + S3	The three-set formula

2.5 Filling the diagram from the centre outwards

The centre lies inside every pair total and every group total. Once it is known, each "two but not the third" region is one subtraction, and each "only" region is one more.

1. Write the centre (region 7). **If it is not given**, find it from the number in none: at least one = n(U) - none, and then S3 = (at least one) - S1 + S2, from the three-set formula.
2. Each pair total minus the centre gives regions 4, 5 and 6.
3. Each group total minus its two "two but not the third" regions and the centre gives regions 1, 2 and 3.
4. None (region 8) = n(U) - (regions 1 to 7).
5. **Check the data.** Every region must be 0 or more, and the eight regions must add up to n(U). A negative region means the data are impossible, or a pair total has been read as "exactly two".

Example (centre not given): of 150 students, 70 play kabaddi (K), 65 cricket (C) and 50 volleyball (V); 30 play K and C, 20 play C and V, 25 play K and V; 22 play none of the three.

- At least one = 150 - 22 = 128. S1 = 70 + 65 + 50 = 185 and S2 = 30 + 20 + 25 = 75. Centre = 128 - 185 + 75 = 18.

Region	Working	Students
All three	128 - 185 + 75	18
K and C but not V	30 - 18	12

Region	Working	Students
C and V but not K	20 - 18	2
K and V but not C	25 - 18	7
Only K	70 - 12 - 7 - 18	33
Only C	65 - 12 - 2 - 18	33
Only V	50 - 2 - 7 - 18	23
None	Given	22

- Check: the eight regions add up to 150, and none is negative. Exactly one = 33 + 33 + 23 = 89 = 185 - 2 × 75 + 3 × 18.

2.6 Two groups: the least and the greatest possible overlap

When only n(U), n(A) and n(B) are given, the overlap is not fixed. The question then asks for the least or the greatest number that can be in both.

Limit	Value	Why	When it happens
Greatest overlap	The smaller of n(A) and n(B)	The common part lies inside each circle, so it cannot be larger than the smaller circle	The smaller circle lies wholly inside the larger one (a proper subset)
Least overlap	n(A) + n(B) - n(U), if this is positive; otherwise 0	n(A ∪ B) cannot exceed n(U), so n(A ∩ B) = n(A) + n(B) - n(A ∪ B) is at least n(A) + n(B) - n(U)	No one is in neither; if n(A) + n(B) is n(U) or less, the circles can be drawn apart and the least is 0

- **The room method** for the least: place the larger group first. The room outside it is n(U) minus that group. Put as many of the smaller group there as will fit. The rest of the smaller group must lie inside the larger one, and that rest is the least overlap.
- Example: of 100 students, 70 passed in English and 60 in Mathematics. Least number who passed both: room outside English = 100 - 70 = 30, so at least 60 - 30 = 30 passed both. Greatest: 60, when every student who passed in Mathematics also passed in English.
- **When some are known to be in neither.** If at least k members are in neither, at most n(U) - k can be inside the circles, so use n(U) - k in place of n(U). Example: if at least 10 of the 100 students passed in neither subject, at least 70 + 60 - 90 = 40 passed both. The greatest stays 60: with all 60 inside the English circle, 30 passed in neither, which is more than 10.

2.7 Percentage versions

Take the total as 100 and use every formula above on the percentages; turn a percentage into a number only at the end (x% of the total). Example: if 85% of candidates passed Paper I and 75% passed Paper II, at least 85 + 75 - 100 = 60% passed both, and at most 75% did. Of 2,000 candidates, that is at least 1,200 and at most 1,500.

Left to other days: Venn diagrams in data sufficiency and puzzles.

3. Extra section: a drill of eight questions with working

Cover the working, solve, then check. The figures are illustrative.

1. Of 90 people, 25 drink only tea, 30 drink only coffee and 15 drink neither. How many drink both, and how many drink tea?

- Working: the four regions add up to 90, so both = 90 - 25 - 30 - 15 = 20. Tea = only tea + both = 25 + 20 = 45.
- Answer: 20 drink both; 45 drink tea.

2. In a town, 62% of households read a Telugu newspaper, 45% read an English newspaper and 18% read neither. What percentage read both? If the town has 4,000 households, how many is that?

- Working: at least one = 100 - 18 = 82%. Both = 62 + 45 - 82 = 25%. 25% of 4,000 = 1,000.
- Answer: 25%, that is, 1,000 households.

3. Of 200 employees, 120 speak Telugu, 80 Hindi and 90 English; 40 speak Telugu and Hindi, 30 Hindi and English, 50 Telugu and English; 20 speak all three. How many speak at least two of the languages, and how many speak none?

- Working: at least two = S2 - 2 × S3 = (40 + 30 + 50) - 2 × 20 = 80. From the regions: exactly two = 20 + 10 + 30 = 60, plus the centre 20, gives 80.
- At least one = 120 + 80 + 90 - 120 + 20 = 190. None = 200 - 190 = 10.
- Answer: 80 speak at least two; 10 speak none.

4. Of 100 students, 45 study Mathematics (M), 40 Physics (P) and 35 Chemistry (C); 15 study M and P, 12 study P and C, 10 study M and C; 12 study none of the three. How many study all three, and how many study only Chemistry?

- Working: at least one = 100 - 12 = 88. S1 = 120 and S2 = 37. Centre = 88 - 120 + 37 = 5.
- P and C but not M = 12 - 5 = 7; M and C but not P = 10 - 5 = 5. Only C = 35 - 7 - 5 - 5 = 18.
- Check: the other regions are M and P but not C = 10, only M = 25 and only P = 18; the seven inside regions add up to 88, and none is negative.
- Answer: 5 study all three; 18 study only Chemistry.

5. Of 80 students, 50 study Hindi and 45 study Sanskrit. What are the least and the greatest numbers who can study both? What is the greatest number who can study neither?

- Working: least = 50 + 45 - 80 = 15 (room outside Hindi = 30, and 45 - 30 = 15). Greatest = the smaller group = 45. Greatest neither = 80 - 50 = 30, when all 45 Sanskrit students also study Hindi.
- Answer: least 15, greatest 45; at most 30 study neither.

6. Of 120 people, 40 swim and 50 cycle. What are the least and the greatest numbers who can do both?

- Working: 40 + 50 - 120 is negative, so the two groups can be wholly separate: least = 0. Greatest = 40. In this case at least 120 - 90 = 30 people do neither.
- Answer: least 0, greatest 40.

7. A report says: of 60 students, 35 like Hindi films, 30 like Telugu films, 10 like both and 8 like neither. Can the report be right?

- Working: at least one by the formula = 35 + 30 - 10 = 55. At least one from "neither" = 60 - 8 = 52. The two do not agree, so the four regions would add up to 25 + 10 + 20 + 8 = 63, not 60.
- Answer: no; the data are impossible.

8. In a survey of 600 people about three apps A, B and C, the regions in percentages are: only A 20%, only B 15%, only C 10%, A and B but not C 12%, B and C but not A 8%, C and A but not B 10%, all three 5%, none 20%. How many people use exactly two apps, and how many use at least two?

- Working: exactly two = 12 + 8 + 10 = 30%, that is, 30% of 600 = 180. At least two = 30 + 5 = 35%, that is, 210. Check: the eight percentages add up to 100.
- Answer: 180 use exactly two; 210 use at least two.

4. Three common exam traps

1. **A pair total already contains the centre.** If 33 are in A and B, 25 in B and C, 19 in C and A, and 7 in all three, the pair totals add up to 77. Exactly two = 77 - 3 × 7 = 56, not 77; at least two = 77 - 2 × 7 = 63. Ask which one the question wants before you subtract.
2. **The seven regions inside the circles are not the whole group.** They add up to the number in at least one group. Those in none are outside every circle, so total = at least one + none. When the centre has to be found, start from total minus none, and when the question asks for a region inside the circles, never let the none group creep into it.
3. **Least and greatest overlap are not interchangeable.** The greatest overlap is the smaller group; the least is the two group totals minus the total, or 0 only when that comes out negative. Of 90 people, if 64 like one thing and 47 another, at least 21 and at most 47 like both; 0 is not possible.

Topic 319

Percentage applications: price, consumption and expenditure relationships

1. Concept in one line

Expenditure on a commodity is price × consumption, so a change in price and a change in consumption combine by multiplying their factors, and at fixed expenditure consumption must move in the inverse ratio of the price. Revision focus: the cut or rise in consumption, the change in expenditure when both change, and the price in "more for the same money" questions.

2. Revision notes

2.1 Recall from earlier topics

- A percentage is a fraction with denominator 100: 1/10 = 10%, 1/8 = 12 1/2%, 1/6 = 16 2/3%, 1/5 = 20%, 1/4 = 25% and 1/3 = 33 1/3%.
- A rise of r per cent multiplies a value by (1 + r/100) and a fall of r per cent by (1 - r/100); for two changes of a% and b% (write a fall with a minus sign): net change = **a + b + ab/100 per cent**.

2.2 The basic identity: expenditure = price × consumption

- The standard aptitude method rests on one identity: **expenditure = price × consumption**. Consumption is the quantity bought or used. 12 kg at ₹45 per kg cost 45 × 12 = ₹540.
- What the buyer spends is what the seller receives: price per unit times quantity.
- In factor form: **factor for expenditure = factor for price × factor for consumption**. Every question in this topic is this one line, solved for the factor that is missing.

2.3 Fixed expenditure: price and consumption are inversely proportional

- If expenditure is fixed, price × consumption is a constant. Two quantities whose product is constant are inversely proportional: when one goes up, the other goes down. If one is multiplied by a factor, the other is divided by the same factor, because the product must not change. Speed and time over a fixed distance behave the same way.
- So, at fixed expenditure, **consumption factor = 1 ÷ price factor**.
- **Price rise of r per cent.** New consumption = C ÷ (1 + r/100) = C × 100/(100 + r), where C is the old consumption. The cut is C - C × 100/(100 + r) = C × r/(100 + r). So **reduction in consumption = r/(100 + r) × 100 per cent**.

- **Price fall of r per cent.** New consumption = C × 100/(100 - r). The increase is C × 100/(100 - r) - C = C × r/(100 - r). So **increase in consumption = r/(100 - r) × 100 per cent**.
- In both rules the denominator is the new price, taking the old price as 100.
- Price rise of 40%: cut 40/140 × 100 = 28 4/7%. Price fall of 40%: consumption may rise by 40/60 × 100 = 66 2/3%.

2.4 The fraction method

- Write the price change as a fraction 1/n.
- A price rise of 1/n makes the price factor (n + 1)/n. The consumption factor is then n/(n + 1) = 1 - 1/(n + 1). So **consumption falls by 1/(n + 1)**. A 25 per cent rise is a rise of 1/4, so consumption falls by 1/5, that is 20 per cent.
- A price fall of 1/n makes the price factor (n - 1)/n. The consumption factor is then n/(n - 1) = 1 + 1/(n - 1). So **consumption rises by 1/(n - 1)**. A 25 per cent fall is a fall of 1/4, so consumption can rise by 1/3, that is 33 1/3 per cent.
- In short: for a price rise, add 1 to the denominator; for a price fall, take 1 away.

Price change of r	r as a fraction	Price rise of r: consumption falls by	Price fall of r: consumption rises by
10%	1/10	1/11 = 9 1/11%	1/9 = 11 1/9%
12 1/2%	1/8	1/9 = 11 1/9%	1/7 = 14 2/7%
20%	1/5	1/6 = 16 2/3%	1/4 = 25%
25%	1/4	1/5 = 20%	1/3 = 33 1/3%
33 1/3%	1/3	1/4 = 25%	1/2 = 50%
50%	1/2	1/3 = 33 1/3%	1/1 = 100%

- Keeping expenditure fixed means undoing the price change through consumption.

2.5 When price and consumption both change

- Multiply the factors. With a price change of a% and a consumption change of b% (a fall written with a minus sign), the **change in expenditure = a + b + ab/100 per cent**.
- Price up 15%, consumption down 10%: 15 - 10 - 150/100 = 3.5%, a rise of 3.5% in expenditure. Check: 1.15 × 0.9 = 1.035.
- Price down 10%, consumption down 5%: -10 - 5 + 50/100 = -14.5%, a fall of 14.5%. Check: 0.9 × 0.95 = 0.855.
- **Working back to consumption.** If the price rises by r% and expenditure may rise by only e%, then consumption factor = (1 + e/100) ÷ (1 + r/100). Price up 25%, expenditure allowed to rise 5%: 1.05 ÷ 1.25 = 0.84, so consumption must fall by 16%. The same in one step: (r - e)/(100 + r) × 100 = 20/125 × 100 = 16%. Plain subtraction (25 - 5 = 20%) is wrong, because the three changes are linked by the product rule, not by addition.

2.6 "More for the same money" and "less for the same money"

The question: a fall of r% in price lets a buyer get q kg more for ₹M. Find the new price and the old price.

- **Step 1.** At the new price, the old quantity costs (100 - r)% of ₹M, because old quantity × new price = old quantity × old price × (1 - r/100) = M × (1 - r/100). So r% of ₹M is saved.
- **Step 2.** The saved money buys exactly the extra q kg, and it buys them at the new price. So **new price = (r% of M) ÷ q**.
- **Step 3.** Old price = new price ÷ (1 - r/100), a reverse change.
- Worked: a fall of 20% in the price of tomatoes lets a family buy 3 kg more for ₹240. Saved money = 20% of 240 = ₹48. New price = 48 ÷ 3 = ₹16 per kg. Old price = 16 ÷ 0.8 = ₹20 per kg. Check: ₹240 bought 12 kg at ₹20 and now buys 15 kg at ₹16, which is 3 kg more.
- Fraction check: a fall of 1/5 lets consumption rise by 1/4 (2.4). So 3 kg is 1/4 of the old quantity, the old quantity is 12 kg, and the old price is 240 ÷ 12 = ₹20.
- ₹48 ÷ 3 kg gives the new price, not the old one, because the extra kilograms are bought at the new price.
- **Less for the same money.** After a price rise of r%, the old quantity would cost ₹M plus r% of ₹M; that extra r% of ₹M is the cost, at the new price, of the q kg the buyer gives up. So again new price = (r% of M) ÷ q, and old price = new price ÷ (1 + r/100). NIOS example: a rise of 25% in the price of sugar makes a person buy 1.5 kg less for ₹240. 25% of 240 = ₹60, and 60 ÷ 1.5 = ₹40 per kg (new price); old price = 40 ÷ 1.25 = ₹32 per kg.

2.7 Income, expenditure and savings

- **Savings = income - expenditure.** Find each in rupees (or take the income as 100) before and after the change; then reckon the change in savings on the old savings. Per cent changes of income and expenditure cannot simply be subtracted.
- Example: income ₹40,000, expenditure 75% of it, that is ₹30,000, and savings ₹10,000. Income rises by 20% to ₹48,000 and expenditure by 10% to ₹33,000. Savings become ₹15,000: a rise of 50%, not 20 - 10 = 10%.

2.8 Common traps

Trap	Wrong working	Right working
Cut in consumption taken equal to the price rise	Price up 40%: cut 40%	40/140 × 100 = 28 4/7%
Rule for a rise used for a fall	Price down 40%: consumption up 40/140 × 100 = 28 4/7%	40/60 × 100 = 66 2/3%
Two changes added	Price up 15%, consumption down 10%: expenditure up 5%	15 - 10 - 150/100 = 3.5%

Trap	Wrong working	Right working
Wrong sign of the product term	Price up 15%, consumption down 10%: 15 - 10 + 1.5 = 6.5%	For a rise and a fall the product term is negative: 3.5%
Saved money ÷ extra quantity taken as the old price	Tomatoes: ₹48 ÷ 3 = ₹16 taken as the old price	₹16 is the new price; old price 16 ÷ 0.8 = ₹20
Change in savings taken as the gap of two per cents	Income up 20%, expenditure up 10%: savings up 10%	₹10,000 to ₹15,000: up 50%

3. Extra section: a drill of eight questions with full working

1. **Fixed expenditure after a rise (fraction method).** The price of milk rises by 12 1/2%. By what per cent must a family cut its consumption to keep its expenditure unchanged? 12 1/2% = 1/8, so consumption falls by 1/9 = 11 1/9%. Check: 9/8 × 8/9 = 1.
2. **Fixed expenditure after a fall (fraction method).** The price of mangoes falls by 16 2/3%. By what per cent can a family raise its consumption without spending more? 16 2/3% = 1/6, so consumption can rise by 1/5 = 20%. Check: 5/6 × 6/5 = 1.
3. **Fixed expenditure, a rate not in the table.** The price of a vegetable rises by 75%. Cut in consumption = 75/175 × 100 = 3/7 × 100 = 42 6/7%.
4. **Both change.** The price of a commodity rises by 25% and a household cuts its consumption by 12%. Change in expenditure = 25 - 12 - 300/100 = 10%, a rise of 10%. Check: 1.25 × 0.88 = 1.1.
5. **Both change, a fall and a rise.** The price of cooking oil falls by 12 1/2% and a household raises its consumption by 20%. Change in expenditure = -12.5 + 20 - 250/100 = 5%, a rise of 5%. Check: 7/8 × 6/5 = 42/40 = 1.05.
6. **Working back to consumption.** The price of electricity per unit rises by 30%. A family will let its electricity bill rise by only 4%. Consumption factor = 1.04 ÷ 1.3 = 0.8, so it must cut its consumption by 20%. In one step: (30 - 4)/130 × 100 = 20%.
7. **More for the same money.** A fall of 10% in the price of onions lets a hotel buy 6 kg more for ₹1,620. Saved money = 10% of 1,620 = ₹162. New price = 162 ÷ 6 = ₹27 per kg. Old price = 27 ÷ 0.9 = ₹30 per kg. Check: 1,620 ÷ 30 = 54 kg before and 1,620 ÷ 27 = 60 kg now, 6 kg more.
8. **Savings.** A clerk earns ₹50,000 a month and spends 80% of it. His income rises by 15% and his expenditure by 10%. Before: expenditure ₹40,000, savings ₹10,000. After: income ₹57,500, expenditure ₹44,000, savings ₹13,500. Savings rise by 3,500/10,000 × 100 = 35%.

4. Three common exam traps

1. **A price rise is met by a smaller cut, a price fall by a larger rise.** At fixed expenditure, a price rise of 60% needs a cut of 60/160 × 100 = 37 1/2% in consumption, not 60%. A price fall of 60% lets consumption rise by 60/40 × 100 = 150%, not 60%.

2. **When price and consumption both change, multiply the factors.** Price up 40% and consumption down 35% give 1.4 × 0.65 = 0.91: expenditure falls by 9%. It does not rise by 40 - 35 = 5%.
3. **Savings must be worked out in rupees.** Income ₹60,000 and expenditure ₹36,000 leave savings of ₹24,000. If income rises by 45% to ₹87,000 and expenditure by 75% to ₹63,000, savings are still ₹24,000: unchanged, not "down 30%".

Topic 320

Current affairs: NITI Aayog's Fiscal Health Index and where Andhra Pradesh stands

1. Concept in one line

NITI Aayog's Fiscal Health Index 2026, released on 11 March 2026, scores 18 major States on their public finances in 2023-24 through five sub-indices and places Andhra Pradesh 17th, with a score of 23.1, in the "Aspirational" category. Revision focus: the sub-indices and their indicators, the categories and the leading States, Andhra Pradesh's scores, and the State's own deficit, debt and GSDP figures, each with its year and data basis.

2. Revision notes

2.1 Fiscal Health Index 2026

- **What and when:** on 11 March 2026 NITI Aayog released the Fiscal Health Index (FHI) 2026, the second annual edition of the index. It was released by NITI Aayog's Vice-Chairman, Suman Bery, and its Chief Executive Officer (CEO), Nidhi Chhibber. The report itself is dated March 2026.
- **Year assessed:** the scores are for 2023-24. The report also follows fiscal trends over ten years, from 2014-15 to 2023-24.
- **Who is ranked:** 18 major States, which the report calls General Category States. This edition adds 10 North-Eastern and Himalayan States, ranked separately from the major States, with some extra indicators of their own. Jammu and Kashmir is left out because it is now a Union territory.
- **Data:** the indicator data are taken from the Comptroller and Auditor General of India (CAG). GSDP (Gross State Domestic Product) is taken at current prices for 2023-24.
- **Andhra Pradesh:** 17th of the 18 major States, score 23.1, category Aspirational. Only Punjab (12.4) is below it.
- **The first edition:** NITI Aayog launched the first Fiscal Health Index in New Delhi on 24 January 2025. It covered 18 major States for the year 2022-23. Andhra Pradesh was 17th in that edition too, with a score of 20.9, also in the Aspirational category. So the news of March 2026 is about the second edition and the year 2023-24.
- **NITI's overall reading:** most of the 18 major States had lower (moderated) scores in 2023-24 than in the year before. NITI's suggested priorities include raising States' own tax revenue, rationalising committed expenditure, better capital spending, medium-term fiscal planning and watching off-budget borrowings.
- **Background:** the residuary State began on 2 June 2014, with an unusually large share of agriculture and allied sectors. GSDP was Rs 15,91,226 crore at current prices in 2024-25 (figure in the Budget 2026-27). the revenue deficit is revenue expenditure

minus revenue receipts; the fiscal deficit is total expenditure minus (revenue receipts + non-debt creating capital receipts); the primary deficit is the fiscal deficit minus interest payments.

2.2 How the index is built

Sub-index	What it measures	Indicators NITI uses for the major States
Quality of Expenditure	How effectively a State deploys its resources, with emphasis on productive spending	Total developmental expenditure as a share of total expenditure; total capital outlay as a share of GSDP
Revenue Mobilisation	A State's capacity to generate its own tax and non-tax revenues	State own revenue as a share of GSDP; State own revenue as a share of total expenditure
Fiscal Prudence	The discipline with which a State manages its deficits and keeps to fiscal rules; the report links it to the FRBM norms	Gross fiscal deficit as a share of GSDP; revenue deficit as a share of GSDP
Debt Index	The size, composition and burden of a State's outstanding liabilities	Interest payments as a share of revenue receipts; outstanding liabilities as a share of GSDP
Debt Sustainability	A State's long-term ability to service its debt without fiscal stress	Growth rate of GSDP minus growth rate of interest payments

- **Nine indicators in all**, two in each sub-index except Debt Sustainability, which has one.
- **How the score is put together:** each sub-index is the average of its indicators' scores. The composite FHI score is the arithmetic mean of the five sub-indices, with no separate weights. For Andhra Pradesh: (43.1 + 21.7 + 9.9 + 36.6 + 4.2) ÷ 5 = 23.1 (worked out).
- **Benchmarks:** for each indicator the target is the best value seen among the States over the past ten years: the highest value for an indicator where more is better, the lowest where less is better.
- **Four categories** for the major States: Achiever, Front Runner, Performer and Aspirational. The report gives the reasons for the grouping in an appendix and prints no score cut-offs, so read the groups from its ranking table.

2.3 The ranking of the 18 major States, 2023-24

Category	States, with rank and FHI score
Achiever	Odisha (1, 73.1); Goa (2, 54.7); Jharkhand (3, 50.5)

Category	States, with rank and FHI score
Front Runner	Gujarat (4, 49.9); Maharashtra (5, 45.0); Chhattisgarh (6, 44.3); Telangana (7, 44.3); Uttar Pradesh (8, 41.9); Karnataka (9, 41.7)
Performer	Madhya Pradesh (10, 37.8); Haryana (11, 34.5); Bihar (12, 30.9); Tamil Nadu (13, 29.8); Rajasthan (14, 27.6)
Aspirational	Kerala (15, 24.8); West Bengal (16, 23.8); Andhra Pradesh (17, 23.1); Punjab (18, 12.4)

- **Counts:** 3 Achievers, 6 Front Runners, 5 Performers and 4 Aspirational States.
- **The Achievers,** as the report describes them, have high own-tax shares, above 60 per cent.
- **The Aspirational group,** as the report describes it: persistent revenue and fiscal deficits, often breaching FRBM norms, debt of roughly 35 to 45 per cent of GSDP, committed expenditure of about 50 to 60 per cent of revenue receipts, large interest payments and relatively low developmental spending.
- **North-Eastern and Himalayan States:** grouped separately as Achievers (Arunachal Pradesh and Uttarakhand), Performers and Aspirational.

2.4 Andhra Pradesh's position, sub-index by sub-index

Sub-index	Andhra Pradesh's score	Its place among the 18 (worked out)	Best State and its score
Quality of Expenditure	43.1	12th	Odisha, 71.2
Revenue Mobilisation	21.7	16th	Goa, 80.4
Fiscal Prudence	9.9	16th	Odisha, 58.7
Debt Index	36.6	13th	Odisha, 95.8
Debt Sustainability	4.2	17th	Odisha, 59.5
Composite FHI score	23.1	17th	Odisha, 73.1

- **Reading the table:** Andhra Pradesh does best on Quality of Expenditure and worst on Debt Sustainability, where only Madhya Pradesh (2.2) is lower.
- **Andhra Pradesh: fiscal position in 2023-24:**
- Fiscal Prudence: "Andhra Pradesh's fiscal deficit of 4.3% of GSDP and continuous revenue shortfall signal deviation from FRBM norms."
- Revenue Mobilisation: the State's score fell from 32.3 (average of 2014-17) to 21.7 (2023-24), "indicating rising expenditure pressures unaccompanied by matching revenue growth."
- Debt: outstanding liabilities rose by over 60 per cent between 2019-20 and 2023-24, with fiscal deficits well above the FRBM thresholds.

- Rigidity: the report names Punjab and Andhra Pradesh for "high expenditure rigidity", that is, a large share of committed spending (salaries, pensions, interest) that cannot easily be cut, together with weak debt sustainability.
- Quality of Expenditure: within this sub-index Andhra Pradesh moved up from Performer to Front Runner, which the report links to the post-COVID capital push and welfare-linked spending.

2.5 Andhra Pradesh's fiscal indicators in the State Budget 2026-27

The Budget 2026-27 was presented on 14 February 2026; the figures below distinguish actuals, revised estimates and budget estimates.

Indicator	Value	Year	Data basis
Revenue deficit	Rs 60,285 crore (3.8 per cent of GSDP)	2024-25 (actuals)	Budget 2026-27
Fiscal deficit	Rs 81,013 crore (5.1 per cent of GSDP)	2024-25 (actuals)	Budget 2026-27
Primary deficit	Rs 48,046 crore (3.0 per cent of GSDP)	2024-25 (actuals)	Budget 2026-27
Revenue deficit	Rs 41,118 crore (2.3 per cent of GSDP)	2025-26 (revised estimate)	Budget 2026-27
Fiscal deficit	Rs 80,567 crore (4.6 per cent of GSDP)	2025-26 (revised estimate)	Budget 2026-27
Revenue deficit	Rs 22,003 crore (1.1 per cent of GSDP)	2026-27 (budget estimate)	Budget 2026-27
Fiscal deficit	Rs 75,868 crore (3.8 per cent of GSDP)	2026-27 (budget estimate)	Budget 2026-27
Outstanding liabilities	36 per cent of GSDP	2024-25, 2025-26 (revised estimate) and 2026-27 (budget estimate) alike	Budget 2026-27
Interest payments	Rs 37,281 crore, 16 per cent of revenue receipts	2026-27 (budget estimate)	Budget 2026-27

- Outstanding liabilities rose from 33 per cent of GSDP in 2021-22 to 36 per cent in 2024-25.

2.6 Has the nominal GSDP tripled in a decade?

Year	GSDP at current prices	Data basis
2014-15	Rs 5,24,976 crore	MoSPI's estimate, in the RBI Handbook of Statistics on Indian States 2024-25

Year	GSDP at current prices	Data basis
2024-25	Rs 15,93,062 crore	MoSPI's estimate, in the same Handbook
2024-25	Rs 16,06,109 crore (First Advance Estimates)	Socio-Economic Survey 2024-25
2024-25	Rs 15,91,226 crore	Figure in the Budget 2026-27

- **Worked out:** on MoSPI's figures, the GSDP of 2024-25 is about 3.03 times that of 2014-15; on the Survey's figure it is about 3.06 times. So the claim holds: the nominal GSDP roughly tripled in ten years.
- **Nominal, not real:** these are current prices, so the tripling includes the rise in prices. Growth at constant (2011-12) prices is smaller.

2.7 FRBM targets and the Finance Commissions, in a line each

- **FRBM:** the index's Fiscal Prudence sub-index measures how far a State keeps to its FRBM norms; Andhra Pradesh's Fiscal Responsibility and Budget Management Act, 2005 sets annual targets to reduce outstanding liabilities, the revenue deficit and the fiscal deficit.
- **Finance Commissions:** distinguish the Fifteenth Finance Commission's earlier fiscal framework from the Sixteenth Finance Commission's fiscal deficit limit of 3 per cent of GSDP for States for 2026-31.

3. Extra section: Andhra Pradesh in the two editions, and the timeline

Item	First edition (launched 24 January 2025; year 2022-23)	Second edition (released 11 March 2026; year 2023-24)
Composite FHI score	20.9	23.1
Rank among the 18 major States	17	17
Category	Aspirational	Aspirational
Quality of Expenditure	31.4	43.1
Revenue Mobilisation	22.1	21.7
Fiscal Prudence	13.3	9.9
Debt Index	37.8	36.6
Debt Sustainability	0.0	4.2

- Each edition works out its own scores, so compare the two columns with care. In both editions Andhra Pradesh is 17th; its gain in the second edition comes mostly from Quality of Expenditure, while Fiscal Prudence fell.

Date	Event
2 June 2014	The residuary State of Andhra Pradesh begins
24 January 2025	First Fiscal Health Index launched, for 2022-23; Andhra Pradesh 17th
14 February 2026	Andhra Pradesh Budget 2026-27 presented
11 March 2026	Fiscal Health Index 2026 released, for 2023-24; Andhra Pradesh 17th, Aspirational

4. Three common exam traps

1. **A higher ratio does not always mean a higher score.** For four indicators (gross fiscal deficit to GSDP, revenue deficit to GSDP, interest payments to revenue receipts and outstanding liabilities to GSDP) less is better, and the benchmark is the lowest value seen. For the other five, such as capital outlay to GSDP and own revenue to GSDP, more is better. So a State with large deficits and heavy debt scores low on those pillars even if its spending is large.
2. **The overall leader does not lead every sub-index.** Odisha is first overall and tops four of the five sub-indices, but Goa tops Revenue Mobilisation, ahead of Odisha by a hair (80.4 against 80.3). A question on "the best State in revenue mobilisation" therefore does not have Odisha as its answer.
3. **A deficit figure belongs to a year and a measurement basis.** The report's remark puts Andhra Pradesh's fiscal deficit at 4.3 per cent of GSDP, in its discussion of the 2023-24 results; the Budget 2026-27 gives 5.1 per cent for 2024-25 (actuals), 4.6 per cent for 2025-26 (revised estimate) and a target of 3.8 per cent for 2026-27. These are different years, not conflicting figures: state the year and whether the figure is an actual, revised estimate or budget estimate.