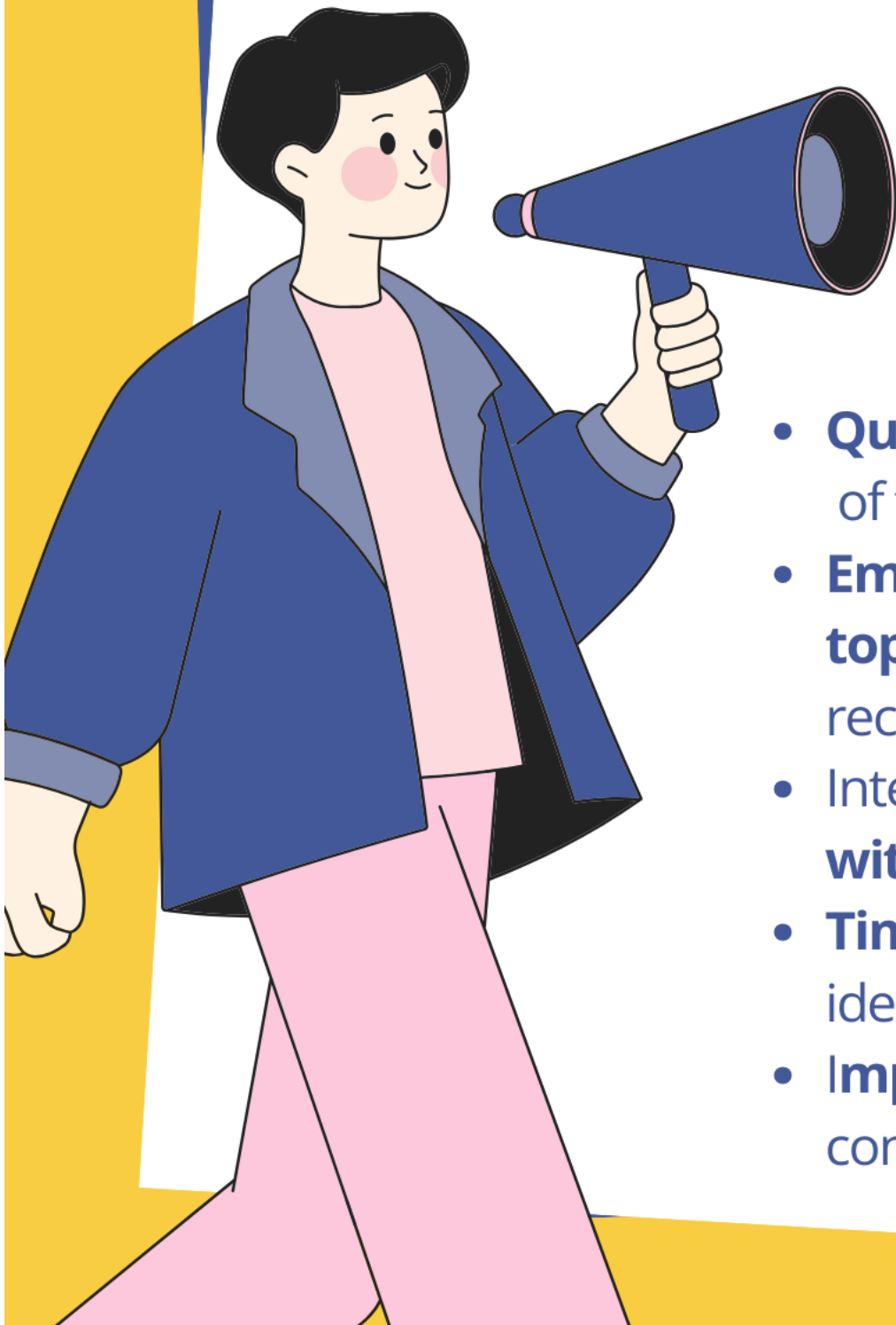# CRASH COURSE – UPSC CSE (PRELIMS)

SCIENCE & TECH

"UPSC tests science not as facts, but as applications that shape governance, security, and development."

Benefit :

- **Quick and focused revision** of the entire UPSC syllabus
- **Emphasis on high-yield topics** based on PYQs and recent trends
- Integration of **static concepts with current affairs**
- **Time-efficient preparation**, ideal for last-phase revision
- I**mproves exam orientation**, confidence, and accuracy

CRASH COURSE – UPSC CSE (PRELIMS) IQRA IAS
(SCIENCE & TECHNOLOGY)

The **Science and Technology** segment in the **UPSC Civil Services Examination (CSE) Prelims** has emerged as a **high-impact and dynamic component** of **General Studies Paper I**, contributing **8–12 questions on average each year**. It evaluates a candidate's **conceptual understanding of scientific principles, ability to apply technology to governance and development, and awareness of contemporary innovations and missions**. With rapid technological advancements and their growing role in national security, space, health, and digital governance, UPSC has increasingly shifted toward **application-oriented Science & Technology**, with strong emphasis on **current affairs linkage, indigenous technologies, and policy-driven scientific developments**.

"Science and Technology in UPSC is not about memorising facts, but about understanding innovation, application, and national relevance — and UPSC rewards those who grasp this linkage."

Science & Technology in UPSC Prelims – PYQ Trend Analysis (Year-wise)

Year	Approx. No. of Questions	Nature of Questions	Major Focus Areas	Trend Insight
2015	7–8	Static + Conceptual	Biotechnology, basic physics, space	NCERT-based, low current linkage
2016	8–9	Conceptual + Applied	Space tech, nuclear tech, ICT	Beginning of application-based shift
2017	9–10	Applied	Space missions, defence tech	Strong current affairs linkage
2018	10–11	Conceptual + Current	Biotechnology, health, ICT	Rise of biotech & health-related questions
2019	8–9	Current-oriented	Space missions, defence, digital tech	Mission-based questioning
2020	10–12	Applied + Analytical	COVID-related health tech, vaccines	Pandemic-driven science focus
2021	9–10	Applied	Vaccines, biotech, digital tech	Governance + health integration
2022	10–11	Conceptual + Current	AI, quantum tech, space missions	Emerging technologies gain prominence
2023	11–12	Analytical	AI, semiconductors, defence systems	Deeper application & elimination-based
2024	12–13	Applied + Policy-linked	Space, AI, green tech, biotech	Policy + indigenous tech focus
2025	12–14	Conceptual + Applied	AI, space missions, defence, health tech	Tech-policy-national relevance integration

Overall Trend (2015–2025): Shift from **static science → applied, mission-based, and policy-linked Science & Technology**.

High-Priority Areas for Science & Technology (UPSC Prelims)

A. Space Technology (Very High Priority)

Key Areas	Why Important for UPSC
ISRO missions (Chandrayaan, Gaganyaan, Aditya-L1, NISAR)	Frequently asked; national relevance
Satellites (NAVIC, Cartosat, Oceansat)	Application in governance & security
Space organisations (ISRO, NSIL, IN-SPACe)	Institutional questions
Deep space & astronomy (James Webb, Lagrange points)	Concept + current linkage

B. Defence Technology (Very High Priority)

Key Areas	Focus
Missile systems (Agni, BrahMos, Astra, K-series)	Static + current integration
Defence systems (ABM, Iron Dome, Stealth tech)	Application-based questions
Defence-related treaties (MTCR, NSG, Wassenaar)	Repeated PYQ themes

C. Biotechnology & Health (Extremely High Priority)

Key Areas	Focus
DNA, RNA, CRISPR, stem cells	Conceptual clarity tested
Vaccines, mRNA, gene therapy	Current affairs driven
GMOs, cloning, DNA fingerprinting	Ethical + applied questions

D. Information & Digital Technology (Very High Priority)

Key Areas	Focus
Artificial Intelligence, Generative AI	Emerging tech favourite
Quantum computing & communication	Conceptual + futuristic
Blockchain, cryptocurrency	Regulatory & tech linkage
Cyber security (CERT-In, dark web)	Governance + security

E. Nanotechnology & Emerging Tech (High Priority)

Key Areas	Focus
Nanomaterials (graphene, CNTs)	Basic science + application
Robotics & automation	Industry & governance relevance

F. Nuclear & Energy Technology (Selective but Important)

Key Areas	Focus
Nuclear fission & fusion	Conceptual
Nuclear agreements & liability	Policy-linked
Renewable & green technologies	Energy transition relevance

UPSC Key Takeaways (For Prelims 2026)

- **Concept > Fact** in Science & Technology
- Strong emphasis on **missions, indigenous tech, and governance application**
- **Static fundamentals + current affairs integration** is non-negotiable
- Elimination-based questions dominate recent papers

Science & Technology – Lecture Plan

Session	Broad Theme	Topics Covered (As Mentioned in Document)
Session 1	Space Technology	Big Bang theory and star formation; Types of space vehicles and satellites; **Missions:** Chandrayaan 1, 2, 3 & 4, OSIRIS–REX, NISAR, CARTOSAT, OCEANSAT, EMISAT, NAVIC, GAGAN, DART, SN5, Quantum satellite, Belle-2, JUICE, Sukrayaan, Gaganyaan, GRAPES, NGARI Wave Observatory, Bharatiya Antrix Station, SOFIA, SMAP, James Webb, Proba-3, AXIOM; **Wings of ISRO:** NSIL, ISPAC, ANTRIX; Formation of ISRO
Session 2	Defence Technology	**Treaties:** PTBT, NPT, CTBT, Australian Group, Wassenaar Arrangement, MTCR, NSG; **Missiles:** Agni, Prithvi, Akash, Nag, Trishul, BrahMos, Nirbhaya, Novator K-100, Astra, Barak, K-series missile, Iron Dome etc.; **System Technology:** Stealth, ABM, BVRAAM, Millimetric Wave Seeker
Session 3	Basic Particle Physics & Nuclear Technology	Dalton, Thomson, Chadwick, Rutherford; Bohr's atomic model; baryons, mesons, leptons, neutrinos, bosons; Large Hadron Collider; radioactivity and radioactive isotopes with applications; nuclear fission and fusion; nuclear power plants and power generation; Nuclear Deal (123 Agreement); Nuclear Liability Act; foreign investment in India
Session 4	Nanotechnology & Robotics	**Nanotech:** Graphene, silicene, carbon nanotubes, tube filters, allotropes of carbon, applications of nanotechnology; **Robotics:** Parts of robots; IRA, LAKSHMI, Software Robot, BRABO, MANAV, MITRO, KIROBO, SOFIA
Session 5	Information, Communication & Technology (ICT)	Modem, bandwidth, broadband, artificial intelligence, big data, data colonisation, data localisation, net neutrality, quantum computer, super computer, NFT, Bluetooth, Wi-Fi, Witricity, Li-Fi
Session 6	Information, Communication & Technology (ICT)	OTT rules, blockchain, cryptocurrency, dark web, Digital India Programme, CERT-In, NASSCOM, IT Amendment Act 2008, ChatGPT, metaverse, generative AI
Session 7	Biotechnology & Health	Cell and its types; stem cells and applications; meiosis and mitosis; cell structure and functioning; DNA; DNA cutting and editing tools like CRISPR
Session 8	Biotechnology & Health	Human Genome Project, ENCODE Project, DNA fingerprinting, cloning, GMOs, vaccines, rDNA technique, DNA barcode, designer baby, three-parent baby, assisted reproductive technology, surrogacy, DNA protection