



SAMARTHYA IAS · AHMEDABAD

DAILY UPSC COMPANION

Samarthya Current Affairs

Prelims facts · Mains frameworks · Practice MCQs

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MCQS

Your Complete UPSC Current Affairs Companion

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Nobel Prize in Physics 2026 and the Frontiers of Neutrino Astronomy

STORY 1 Google News

Francis Halzen Wins 2026 Physics Nobel for Astrophysical Neutrino Discovery

Francis Halzen has been awarded the 2026 Nobel Prize in Physics for his pioneering work in discovering high-energy neutrinos of astrophysical origin.

The discovery was made using the IceCube Neutrino Observatory, a massive detector located deep beneath the ice at the Earth's South Pole.

Neutrinos, often called 'ghost particles,' are extremely light subatomic particles that rarely interact with matter, making their detection exceptionally challenging.

Halzen's conceptualization of the IceCube observatory, which uses a cubic kilometer of Antarctic ice, revolutionized the field of particle astrophysics.

This breakthrough provides scientists with a new way to observe the universe, opening up the era of neutrino-based astronomy.

UPSC RELEVANCE

GS Paper III - Science and Technology- developments and their applications and effects in everyday life; Achievements of Indians in science & technology; indigenization of technology and developing new technology.

PRELIMS FACTS

- The 2026 Nobel Prize in Physics was awarded to Francis Halzen for the discovery of high-energy astrophysical neutrinos.
- IceCube is the world's largest neutrino detector, utilizing a cubic kilometer of deep Antarctic ice at the South Pole.
- Neutrinos are subatomic particles with extremely low mass and neutral charge, earning them the moniker 'ghost particles'.

MAINS FRAMEWORK

Intro: The award of the 2026 Nobel Prize in Physics to Francis Halzen for astrophysical neutrino discovery marks a watershed moment in observational astronomy.

DIMENSIONS

- **Scientific Significance:** Transitioning from optical/electromagnetic astronomy to neutrino-based 'ghost particle' detection.
- **Technological Marvel of IceCube:** Utilizing a cubic kilometer of Antarctic ice as a natural detector medium.
- **India's Role and Global Collaborations:** The importance of international physics collaborations and India's own neutrino observatory aspirations.

Way forward: Accelerate global funding for deep-space particle detectors and strengthen academic-industry linkages in high-energy physics.

PYQ LINK

UPSC CSE 2021 Mains GS-III question on the scientific principles and significance of the India-based Neutrino Observatory (INO) project.

KEY TERMS

Neutrino Astronomy

IceCube Neutrino Observatory

Astrophysical Neutrinos

Ghost Particles

High-Energy Physics

ACTS & ARTICLES

Article 51A(h) of the Constitution (developing scientific temper)

02

INTERNATIONAL RELATIONS

India-Africa Relations and Global South Solidarity



STORY 1 The Hindu

External Affairs Minister Undertakes Five-Day Visit to Three African Nations

External Affairs Minister S. Jaishankar embarked on a five-day official visit to Ghana, Côte d'Ivoire, and Ethiopia starting October 6, 2026.

The diplomatic visit aims to strengthen bilateral cooperation in key sectors including trade, investment, infrastructure development, and capacity building across the African continent.

This diplomatic mission reflects India's strategic commitment to deepening its partnership with Africa and fostering solidarity with the Global South.

Jaishankar will hold bilateral talks with his counterparts and meet the top leadership of all three nations to review cooperative ties.

The high-level engagement highlights India's growing role in development cooperation, capacity building, and people-to-people ties across the African continent.

UPSC RELEVANCE

GS Paper II - Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests; Effect of policies and politics of developed and developing countries on India's interests.

PRELIMS FACTS

- External Affairs Minister S. Jaishankar's October 2026 African tour covers Ghana, Côte d'Ivoire, and Ethiopia.
- Côte d'Ivoire is a key West African nation, while Ethiopia hosts the headquarters of the African Union in Addis Ababa.
- India's development partnership with Africa focuses heavily on capacity building, infrastructure, and Global South solidarity.

MAINS FRAMEWORK

Intro: India's diplomatic engagement with Ghana, Côte d'Ivoire, and Ethiopia underscores its strategic pivot towards Africa and leadership of the Global South.

DIMENSIONS

- **Economic and Trade Synergy:** Expanding bilateral trade, investment, and infrastructure development in West and East Africa.
- **Capacity Building and Human Resource Development:** Leveraging India's ITEC program and digital public infrastructure (DPI) sharing.
- **Geopolitical Alignment:** Fostering solidarity on multilateral forums, climate justice, and UN Security Council reforms.

Way forward: Institutionalize regular high-level summits, diversify trade baskets, and counter competing geopolitical influences through transparent, demand-driven partnerships.

PYQ LINK

UPSC CSE 2021 Mains GS-II question on the strategic and economic significance of India's engagement with Africa.

KEY TERMS

03

SOCIAL JUSTICE & GOVERNANCE

Gender-Responsive Public Infrastructure and Women's Mobility

STORY 1 **The Hindu**

Telangana Issues Over 35 Crore Zero-Fare Bus Tickets to Women

The Telangana State Road Transport Corporation issued an impressive 35.651 crore zero-fare tickets to women during July, August, and September 2026.

This represents an increase of nearly 97.20 lakh tickets compared to the corresponding three-month period of the previous year.

To accommodate the surging demand for public transport, the state transport utility has significantly increased bus trips across various regional routes.

The free travel scheme has dramatically boosted women's mobility across the state, enabling greater access to employment, education, and social opportunities.

This progressive initiative highlights the critical role of gender-responsive public infrastructure in promoting inclusive urban and rural development in India.

UPSC RELEVANCE

GS Paper II - Welfare schemes for vulnerable sections of the population by the Centre and States and the performance of these schemes; GS Paper I - Social empowerment.

PRELIMS FACTS

- Telangana State Road Transport Corporation (TGSRTC) issued over 35 crore zero-fare tickets to women in a single quarter of 2026.
- Zero-fare public transport schemes are designed to enhance female labor force participation and ensure safe mobility.
- Gender-responsive budgeting in public transport directly addresses the disproportionate travel costs faced by women.

MAINS FRAMEWORK

Intro: The massive surge in zero-fare bus ticket usage in Telangana highlights the transformative impact of gender-responsive public infrastructure on women's empowerment.

DIMENSIONS

- **Economic Empowerment:** Reducing disposable income expenditure on commuting, thereby boosting female labor force participation.
- **Social Inclusion and Safety:** Enhancing access to higher education, healthcare, and safe public spaces for women and girls.
- **Fiscal and Operational Challenges:** Balancing state transport corporation losses with social welfare benefits and expanding fleet capacity.

Way forward: Implement state-backed viability gap funding for transport corporations, deploy smart transit tracking, and integrate gender-responsive urban planning.

PYQ LINK

UPSC CSE 2023 Mains GS-I question on how gender-responsive urban planning and infrastructure can empower women in India.

KEY TERMS

Gender-Responsive Budgeting

Women's Mobility

Social Empowerment

Public Infrastructure

Inclusive Development

ACTS & ARTICLES

Article 15(3) (Special provisions for women)

Article 39(a) (Right to adequate means of livelihood)

SDG 5 (Gender Equality)



STORY 1 **Times of India**

Kenya Confirms First Ebola Case as Patient Arriving From Congo Dies

Kenya confirmed its first case linked to the fastest-spreading Ebola outbreak in history after a citizen arriving from Congo died.

The patient, who traveled via Uganda, was isolated and treated at a Nairobi hospital before succumbing to hemorrhagic fever.

Health authorities have identified 28 close contacts, including family members and healthcare workers, who will be isolated for 21 days.

Another 23 passengers who traveled on the same flight from Uganda are currently being traced by the health ministry.

The incident underscores the critical need for robust cross-border surveillance and rapid response mechanisms to contain highly infectious diseases.

STORY 2 **Google News**

Broadly Protective Influenza Vaccines Offer Path to Blunt Future Pandemics

Scientific research highlights that broadly protective influenza vaccines could serve as a critical defense mechanism to blunt future global pandemics.

Unlike traditional seasonal flu shots, these advanced vaccines target conserved regions of the virus to offer wider, long-lasting immunity.

Developing universal vaccine platforms is absolutely essential to counter rapidly mutating viral strains that bypass existing human immune defenses.

The research emphasizes global collaboration in vaccine technology to prevent the catastrophic social and economic impacts of respiratory pandemics.

This scientific advancement aligns with India's public health goals of strengthening preventive healthcare and achieving self-reliance in vaccine manufacturing.

UPSC RELEVANCE

PRELIMS FACTS

- Kenya confirmed its first case of the current Ebola outbreak in October 2026, involving a citizen traveling from Congo via Uganda.
- Ebola virus disease is a severe, often fatal illness in humans characterized by hemorrhagic fever symptoms.
- Broadly protective influenza vaccines target conserved viral regions to provide immunity against multiple mutating strains.

MAINS FRAMEWORK

Intro: The spread of Ebola to Kenya and the scientific push for broadly protective vaccines highlight the urgent need for a resilient global health security architecture.

DIMENSIONS

- **Cross-Border Epidemiological Vulnerabilities:** Rapid transit networks facilitating the spread of highly infectious pathogens like Ebola.
- **Vaccine Innovation and Universal Platforms:** Moving away from reactive seasonal vaccines to broadly protective, mutation-resistant formulations.
- **Global Health Governance:** Strengthening WHO's International Health Regulations (IHR) and regional surveillance networks.

Way forward: Enhance real-time cross-border contact tracing, invest in universal vaccine research, and establish decentralized medical manufacturing hubs in developing nations.

PYQ LINK

UPSC CSE 2020 Mains GS-II question on the role of international organizations and global health security frameworks during pandemics.

KEY TERMS

Global Health Security

Epidemiological Surveillance

Ebola Virus Disease

Broadly Protective Vaccines

International Health Regulations

ACTS & ARTICLES

International Health Regulations (IHR 2005)

Article 47 of the Constitution (Duty of the State to raise the level of nutrition and standard of living and to improve public health)

Urban Infrastructure, Congestion, and Traffic Management in India

STORY 1 Google News

Design Flaws in Delhi's Barapullah Flyover Extension Cause Severe Traffic Congestion

The Barapullah flyover extension in Delhi, designed to alleviate urban traffic congestion, has instead triggered severe bottlenecks and daily jams.

Commuters face prolonged delays on a daily basis due to structural integration issues and inadequate planning at key exit and entry points.

The situation highlights the critical gap between macro-level infrastructure planning and micro-level traffic flow dynamics in metropolitan cities.

Urban planners emphasize that major flyover projects must incorporate comprehensive traffic simulation models before execution to prevent bottleneck creation.

This issue underscores the need for sustainable urban mobility solutions and scientific traffic management under India's urban development frameworks.

UPSC RELEVANCE

GS Paper III - Infrastructure: Energy, Ports, Roads, Airports, Railways etc.; GS Paper I - Urbanization, their problems and their remedies.

PRELIMS FACTS

- The Barapullah flyover is a major elevated corridor in Delhi designed to bypass heavy surface traffic.
- Structural integration failures at entry and exit points of flyovers are primary causes of urban traffic bottlenecks.
- Traffic simulation modeling is a pre-execution planning tool used to predict vehicle flow and prevent congestion.

MAINS FRAMEWORK

Intro: The traffic congestion caused by Delhi's Barapullah flyover extension illustrates the systemic challenges of urban planning and structural integration in Indian metropolitan areas.

DIMENSIONS

- **Structural and Design Flaws:** Inadequate integration of elevated corridors with existing surface roads, creating severe bottlenecks.

- **Car-Centric vs. Transit-Oriented Development:** Over-reliance on flyovers rather than robust public transit systems to solve congestion.
- **Economic and Environmental Costs:** Increased fuel wastage, air pollution, and lost productivity due to prolonged traffic delays.

Way forward: Adopt Transit-Oriented Development (TOD) policies, mandate scientific traffic simulation modeling, and prioritize multi-modal transport integration.

PYQ LINK

UPSC CSE 2022 Mains GS-III question on the challenges of urban transport planning and the need for sustainable urban mobility.

KEY TERMS

Urban Congestion

Transit-Oriented Development

Traffic Simulation Modeling

Infrastructure Integration

Sustainable Mobility

ACTS & ARTICLES

National Urban Transport Policy (NUTP)

74th Constitutional Amendment Act (Urban Planning power to ULBs)

SDG 11 (Sustainable Cities and Communities)

06

ENVIRONMENT & EVOLUTIONARY BIOLOGY

Paleontological Discoveries and Evolutionary Biology



STORY 1 Times of India

Prehistoric Amber Fossils Reveal New Insect Species With Extraordinary Mouthparts

Researchers identified a new prehistoric insect species, *Cretodorus noonoo*, beautifully preserved in 99-million-year-old Kachin amber from Myanmar.

The study examined 13 insect specimens belonging to Neazoniidae, an ancient family of planthoppers that lived during the dinosaur era.

The newly discovered species possessed an exceptionally long, flexible mouthpart that reached nearly twice its total body length.

Scientists believe this unique biological adaptation allowed the insect to probe deep into tree bark to access hidden sap.

The discovery provides invaluable insights into Cretaceous ecosystems, evolutionary biology, and the specialized feeding mechanisms of ancient organisms.

UPSC RELEVANCE

GS Paper III - Conservation, environmental pollution and degradation, environmental impact assessment; Science and Technology- developments.

PRELIMS FACTS

- *Cretodorus noonoo* is a newly discovered prehistoric planthopper species preserved in 99-million-year-old Kachin amber.
- Kachin amber fossils from Myanmar date back to the Cretaceous period, providing a window into the era of dinosaurs.
- The *Cretodorus noonoo* species is characterized by a flexible mouthpart that is nearly twice its total body length.

MAINS FRAMEWORK

Intro: The discovery of *Cretodorus noonoo* in 99-million-year-old amber provides a rare evolutionary window into Cretaceous ecosystems and specialized ecological niches.

DIMENSIONS

- **Evolutionary Adaptation:** The development of extreme morphological features (long mouthparts) to access specialized food sources.
- **Paleontological Preservation:** The unique role of amber (fossilized resin) in preserving soft-tissue structures that are lost in rock fossils.
- **Reconstruction of Prehistoric Food Webs:** Understanding plant-insect co-evolution and the biodiversity of the Mesozoic era.

Way forward: Strengthen international regulations against illegal amber mining, promote collaborative paleontological research, and integrate evolutionary biology into modern ecological conservation.

PYQ LINK

UPSC CSE 2019 Mains GS-III question on the importance of biodiversity conservation and understanding evolutionary history.

KEY TERMS

Paleontology

Evolutionary Adaptation

Cretaceous Period

Amber Fossils

Biodiversity Conservation

ACTS & ARTICLES

Biological Diversity Act, 2002

Article 51A(g) (Duty to protect and improve the natural environment)

07

GOVERNANCE & EDUCATION

Educational Governance and Quality Enhancement in School Systems



STORY 1 **The Hindu**

NITI Aayog Report Highlights Learning Outcomes and Challenges in Punjab Schools

A NITI Aayog report titled 'School Education System in India' identifies Punjab as a strong performer in student learning outcomes.

Despite positive assessments, public allegations of severe teacher shortages in government schools have put the state's education reforms under scrutiny.

The state government has defended its record by highlighting initiatives like the Schools of Eminence scheme and foundational-learning programs.

The controversy underscores the persistent gap between high-level policy achievements and ground-level infrastructural and staffing realities in schools.

This development highlights the need for robust educational governance, balanced teacher distribution, and sustained investment in public school infrastructure.



STORY 2 **Times of India**

Non-Profit After-School Program Empowers Over Three Thousand Underserved US Teens

The 'Just Keep Livin Foundation,' an after-school program for underserved high school students, now serves over 3,000 teens across 15 US cities.

Operating primarily in Title 1 schools, the unique initiative focuses on fitness, nutrition, wellness, and active community service.

In 2022, participating students completed over 7,200 hours of community service, demonstrating the program's strong civic engagement and social impact.

The foundation also expanded its reach to support Uvalde High School following the tragic mass shooting in May 2022.

This model illustrates how civil society organizations and non-profits can effectively supplement public education systems to support vulnerable youth.

UPSC RELEVANCE

GS Paper II - Issues relating to development and management of Social Sector/Services relating to Education, Human Resources.

PRELIMS FACTS

- NITI Aayog's May 2026 report on school education system analysis ranks Punjab among the stronger performers in learning outcomes.
- The Schools of Eminence scheme is a specialized public education initiative implemented by the Punjab government.
- Title 1 schools in the United States are institutions receiving federal funding due to high percentages of low-income students.

MAINS FRAMEWORK

Intro: While NITI Aayog reports praise Punjab's learning outcomes, ground-level teacher shortages highlight the structural dualism in India's public education system.

DIMENSIONS

- **Policy vs. Implementation Gap:** High performance in standardized metrics coexisting with severe localized teacher vacancies.
- **Innovative Pedagogical Interventions:** The role of specialized initiatives like the 'Schools of Eminence' in bridging the quality gap.
- **Civil Society and After-School Support:** How structured non-profit programs (e.g., the Just Keep Livin model) can supplement formal schooling.

Way forward: Rationalize teacher recruitment and deployment, leverage digital tools for foundational learning, and foster public-private-civil society partnerships in education.

PYQ LINK

UPSC CSE 2022 Mains GS-II question on the role of NITI Aayog in reforming the school education system and improving learning outcomes.

KEY TERMS

Learning Outcomes

NITI Aayog

Foundational Learning

Educational Governance

Civil Society Interventions

ACTS & ARTICLES

Right to Education (RTE) Act, 2009

Article 21A (Right to Education)

SDG 4 (Quality Education)



Practice MCQs (UPSC Prelims)

Attempt these questions on your own first. The answer key is on the next page.

SCIENCE & TECHNOLOGY

Nobel Prize in Physics 2026 and the Frontiers of Neutrino Astronomy

Francis Halzen Wins 2026 Physics Nobel for Astrophysical Neutrino Discovery

Q1. With reference to the IceCube Neutrino Observatory, consider the following statements: 1. It is the world's largest neutrino detector, located deep beneath the ice at the Earth's South Pole. 2. It was conceptualized by Francis Halzen, who was awarded the 2026 Nobel Prize in Physics. 3. It detects neutrinos by capturing the radiation produced when they interact with the surrounding ice. Which of the statements given above are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

INTERNATIONAL RELATIONS

India-Africa Relations and Global South Solidarity

External Affairs Minister Undertakes Five-Day Visit to Three African Nations

Q2. In October 2026, India's External Affairs Minister embarked on a five-day visit to which of the following African nations to deepen bilateral ties?

- A. Kenya, South Africa, and Nigeria
- B. Ghana, Côte d'Ivoire, and Ethiopia
- C. Egypt, Sudan, and Morocco
- D. Tanzania, Uganda, and Rwanda

SOCIAL JUSTICE & GOVERNANCE

Gender-Responsive Public Infrastructure and Women's Mobility

Telangana Issues Over 35 Crore Zero-Fare Bus Tickets to Women

Q3. Consider the following statements regarding the zero-fare bus ticket scheme for women in Telangana: 1. Over 35 crore zero-fare tickets were issued to women in the three-month period of July, August, and September 2026. 2. The scheme led to a decline in the total number of bus trips operated by the state road transport corporation due to financial losses. Which of the statements given above is/are correct?

- A. 1 only
- B. 2 only
- C. Both 1 and 2
- D. Neither 1 nor 2

Kenya Confirms First Ebola Case as Patient Arriving From Congo Dies

Q4. With reference to the Ebola virus disease case reported in Kenya in October 2026, consider the following statements: 1. The patient was a Kenyan citizen who arrived in the country from Congo via Uganda. 2. The Ebola virus is known to cause severe hemorrhagic fever in humans. 3. The incubation period requiring isolation for close contacts of Ebola is typically 21 days. Which of the statements given above are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2 and 3

Paleontological Discoveries and Evolutionary Biology

Prehistoric Amber Fossils Reveal New Insect Species With Extraordinary Mouthparts

Q5. A newly discovered prehistoric insect species, *Cretodorus noonoo*, preserved in 99-million-year-old Kachin amber, belongs to which of the following families?

- A. Apidae (Bees)
- B. Neazoniidae (Planthoppers)
- C. Formicidae (Ants)
- D. Culicidae (Mosquitoes)

Educational Governance and Quality Enhancement in School Systems

NITI Aayog Report Highlights Learning Outcomes and Challenges in Punjab Schools

Q6. Consider the following statements regarding the school education system in India as per the NITI Aayog report mentioned in October 2026: 1. The report is titled 'School Education System in India: Temporal Analysis and Policy Roadmap for Quality Enhancement.' 2. The report identifies Punjab as one of the stronger performers in student learning outcomes. Which of the statements given above is/are correct?

- A. 1 only
- B. 2 only
- C. Both 1 and 2
- D. Neither 1 nor 2

Answer Key — Practice MCQs

Quick reference and explanations for the practice questions on the previous page.

Q1: D**Q2: B****Q3: A****Q4: D****Q5: B****Q6: C**

Q1 Option D • 1, 2 and 3

All statements are correct. The IceCube Neutrino Observatory is located at the Earth's South Pole (Antarctica). It was conceptualized by Francis Halzen, who won the 2026 Nobel Prize in Physics. It detects neutrinos by capturing the radiation produced when they interact with the surrounding ice.

Q2 Option B • Ghana, Côte d'Ivoire, and Ethiopia

As per the official announcement on October 6, 2026, External Affairs Minister S. Jaishankar embarked on a five-day visit to Ghana, Côte d'Ivoire, and Ethiopia to strengthen bilateral cooperation.

Q3 Option A • 1 only

Statement 1 is correct; 35.651 crore zero-fare tickets were issued in July, August, and September 2026. Statement 2 is incorrect because the Telangana State Road Transport Corporation (TSRTC) actually increased bus services and trips across various regions to accommodate the surge in demand.

Q4 Option D • 1, 2 and 3

All statements are correct. The patient arrived from Congo via Uganda, developed symptoms of hemorrhagic fever, and died. Close contacts are being isolated for 21 days, which is the standard monitoring period for Ebola.

Q5 Option B • Neazoniidae (Planthoppers)

The researchers examined insect fossils belonging to Neazoniidae, an ancient family of planthoppers, to identify the new species *Cretodorus noonoo*.

Q6 Option C • Both 1 and 2

Both statements are correct. The NITI Aayog's May 2026 report is titled 'School Education System in India: Temporal Analysis and Policy Roadmap for Quality Enhancement' and it identifies Punjab among the stronger performers in learning outcomes.