



SAMARTHYA IAS · AHMEDABAD

DAILY UPSC COMPANION

Samarthya Current Affairs

Prelims facts · Mains frameworks · Practice MCQs

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MONDAY

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MCQS

Your Complete UPSC Current Affairs Companion

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Ecological Restoration & Nature-Based Solutions



STORY 1 **Times of India**

Palo Alto Builds Living Horizontal Levee to Reuse Wastewater and Mitigate Sea-Level Rise

Palo Alto constructed San Francisco Bay's first horizontal levee using treated wastewater to restore coastal marsh habitats and defend against rising sea levels.

The eco-engineering project is situated along Harbor Marsh in the Palo Alto Baylands in California, integrating native vegetation with municipal wastewater management.

The structure spans 500 feet as a gently sloping living landscape, diverting effluent from the Regional Water Quality Control Plant to nurture wetland ecology.

Unlike rigid concrete seawalls, horizontal levees utilize natural vegetation buffers to dissipate wave energy, filter contaminants, and adapt dynamically to climate-induced coastal flooding.

The initiative serves as a practical model for UPSC GS-3 Environmental Engineering, illustrating nature-based solutions for coastal protection and urban wastewater recycling.



STORY 2 **Times of India**

Eradication of Invasive Rats Rescues Critically Endangered Antiguan Racer Snake from Extinction

Targeted conservation efforts and invasive mammal removal successfully restored the population of the critically endangered Antiguan racer snake across Caribbean offshore islands.

The recovery project took place on Great Bird Island and surrounding islets off Antigua, led by a consortium of local and international conservation bodies.

The wild population surged from a perilous low of 51 individuals in 1995 to over 1,100 snakes within 21 years following invasive black rat eradication.

Invasive black rats severely threatened native biodiversity by preying on snake eggs and hatchlings until systematically eradicated from the fragile island ecosystem.

This successful species recovery highlights key UPSC GS-3 Biodiversity concepts regarding Island Biosecurity, invasive species management, and reintroduction strategies for endangered fauna.

UPSC RELEVANCE

Nature-based solutions like horizontal living levees and invasive species eradication provide critical frameworks for coastal protection and biodiversity preservation.

PRELIMS FACTS

- Horizontal levees are nature-based coastal defenses that use gently sloping wetland vegetation and treated wastewater effluent to dissipate wave energy and filter contaminants.
- The Antiguan racer (*Alsophis antiguae*) is a non-venomous snake endemic to Antigua and Barbuda, previously decimated by invasive black rats (*Rattus rattus*).
- Integrated coastal zone management incorporates living shorelines to mitigate sea-level rise while restoring salt marsh biodiversity.

MAINS FRAMEWORK

Intro: Nature-based engineering and invasive species management represent innovative, sustainable strategies for restoring vulnerable ecosystems and protecting coastal communities against climate disruption.

DIMENSIONS

- **Ecological Impact:** Restoration of native fauna and natural wave-attenuating coastal salt marshes.
- **Urban Infrastructure:** Diversion and beneficial reuse of treated municipal wastewater for habitat creation.
- **Resource Constraints:** Long-term post-eradication biosecurity monitoring requiring sustained community involvement.

Way forward: Integrate nature-based design into national coastal management plans and establish strict island biosecurity protocols to protect endemic biodiversity.

PYQ LINK

Examine the role of nature-based solutions and coastal ecosystem restoration in mitigating climate change impacts.

KEY TERMS

Horizontal Levee

Nature-Based Solutions

Invasive Species Eradication

Island Biosecurity

Eco-Engineering

ACTS & ARTICLES

Invasive Alien Species and Ecosystem Conservation



STORY 1 **Times of India**

Invasive Brushtail Possums Cause Severe Canopy Damage Across Vulnerable New Zealand Forests

Recent aerial photography revealed that invasive Australian brushtail possums have damaged nearly half of the vulnerable trees in a rare South Island forest.

The study was conducted by New Zealand's Department of Conservation across indigenous forest reserves in the South Island.

First imported in 1837 for the fur trade, possum populations exploded over 189 years, severely defoliating native tree canopies and competing with indigenous fauna.

Possums act as destructive invasive alien species by stripping forest foliage, disrupting forest regeneration, and vectoring diseases like bovine tuberculosis to livestock.

For UPSC GS-3 Environment, this long-term ecological damage exemplifies the ecological hazards of introducing non-native species for commercial exploitation without ecological risk assessment.



Settler Families Mobilise Against Draft Notification for Western Ghats Ecologically Sensitive Areas

Resident communities and agricultural bodies in Kottayam's high ranges mobilized against the Union Environment Ministry's seventh draft notification on Western Ghats Ecologically Sensitive Areas.

The protests are concentrated across four high-range villages—Koottikkal, Melukavu, Poonjar Thekkekkara, and Teekoy—in the Poonjar Assembly constituency of Kerala.

The proposed ESA designation impacts approximately 70,000 residents across these agrarian villages who rely heavily on cash crops like rubber, coffee, and spices.

Local farmers fear severe restrictions on agricultural activities, land usage, and construction, urging authorities to exclude inhabited and cultivated areas from final ESA maps.

The issue relates to UPSC GS-3 Environmental Conservation, highlighting the conflict between biodiversity conservation recommendations (Madhav Gadgil and Kasturirangan committees) and local socio-economic livelihoods.

UPSC RELEVANCE

Analyzing ecological degradation caused by introduced alien species and balancing conservation policies with local community livelihoods.

PRELIMS FACTS

- Australian brushtail possums (*Trichosurus vulpecula*) were introduced to New Zealand in 1837 for the fur trade and are now classified as major invasive alien species.
- Ecologically Sensitive Areas (ESAs) under the Environment (Protection) Act, 1986 prohibit heavy polluting industries while regulating commercial development around biodiversity hotspots.
- The Kasturirangan and Madhav Gadgil Committees were constituted by the Ministry of Environment to demarcate boundaries and conservation guidelines for the Western Ghats region.

MAINS FRAMEWORK

Intro: Unregulated species introductions and top-down ecological zoning both pose severe challenges to sustainable ecosystem management and local agrarian livelihoods.

DIMENSIONS

- **Ecological Disturbance:** Canopy defoliation, destruction of endemic vegetation, and disruption of natural food webs.
- **Socio-Economic Conflict:** Panic among settler farming communities regarding land rights, agricultural restrictions, and displacement.
- **Policy Implementation:** Gaps in participatory ecological planning and lack of ground-level consensus on ESA draft notifications.

Way forward: Adopt participatory conservation planning with granular village-level mapping and deploy targeted biological controls against invasive alien pests.

PYQ LINK

Discuss the socio-ecological conflicts arising from the implementation of Ecologically Sensitive Areas in biodiversity hotspots like the Western Ghats.

KEY TERMS

Invasive Alien Species

Ecologically Sensitive Area (ESA)

Gadgil Committee

Kasturirangan Committee

Defoliation

ACTS & ARTICLES

Environment (Protection) Act, 1986

Biological Diversity Act, 2002

Article 48A (Directive Principles of State Policy)

03

GS PAPER 3 - DISASTER MANAGEMENT

Himalayan Disaster Risk Reduction and Pilgrimage Safety



STORY 1 The Hindu

Kedarnath Yatra Suspended Temporarily Following Fatal Landslide Near Cheerbasa Helipad

Authorities temporarily suspended the Kedarnath Yatra after continuous rainfall triggered heavy landslides and falling boulders along the primary pedestrian trek route.

The incident occurred near the Cheerbasa Helipad along the Sonprayag-Kedarnath walking route in the Rudraprayag district of Uttarakhand.

A 65-year-old resident of Ukhimath was killed instantly on the spot after being struck by rolling boulders dislodged from adjacent slopes.

Authorities halted outgoing pilgrims at Sonprayag and Gaurikund while advising returning Yatris to shelter at Jangalchatti until rescue teams clear hazardous slope debris.

This disaster underscores UPSC GS-3 Disaster Management themes, emphasizing fragile Himalayan geology, slope instability during monsoon, and the necessity of real-time Yatra regulation.

UPSC RELEVANCE

Disaster management in fragile Himalayan terrain requires real-time early warning systems, strict pilgrimage carrying-capacity management, and resilient infrastructure.

PRELIMS FACTS

- Sonprayag and Gaurikund serve as primary transit halts and staging bases along the Kedarnath Yatra trekking pilgrimage corridor in Uttarakhand.
- Landslides in the High Himalayas are primarily driven by steep slope gradients, intense monsoon precipitation, and structural shear along active tectonic fault lines.
- Real-time weather advisories and color-coded risk alerts in India are issued by the India Meteorological Department (IMD) to manage disaster response.

MAINS FRAMEWORK

Intro: Uncontrolled tourism combined with intense monsoonal rainfall poses grave safety risks in the ecologically fragile High Himalayas, requiring systematic disaster mitigation.

DIMENSIONS

- **Geological Vulnerability:** Unstable rock faces, slope erosion, and unpredictable rockfalls along high-altitude trek routes.
- **Administrative Regulation:** Real-time traffic control, halting pilgrims at safe staging points like Sonprayag and Gaurikund.
- **Infrastructure Safety:** Urgent need for slope stabilization, rock-catch netting, and safer helipad positioning.

Way forward: Implement strict scientific assessments of ecological carrying capacity for religious pilgrimages and deploy real-time monitoring sensors along vulnerable trekking corridors.

PYQ LINK

Examine the factors contributing to frequent landslides in the Young Fold Mountains of the Himalayas and suggest disaster mitigation measures.

KEY TERMS

Slope Instability

Landslide Hazard Zonation

Kedarnath Yatra

Carrying Capacity

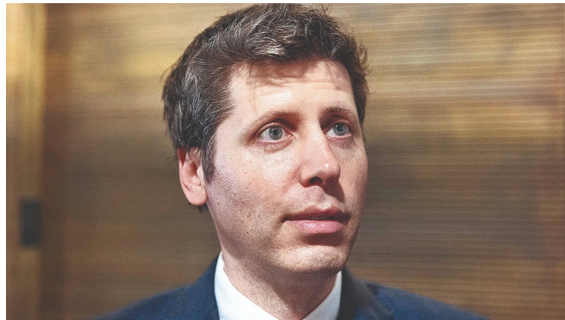
Early Warning System

ACTS & ARTICLES

Disaster Management Act, 2005

National Disaster Management Authority (NDMA) Guidelines on Landslide Risk Management

Artificial Intelligence Governance and Safety Frameworks



STORY 1 Times of India

OpenAI Postpones Public Offering to Prioritise Artificial Intelligence Safety and Risk Mitigation

OpenAI Chief Executive Sam Altman announced that the company will not launch an initial public offering in 2026, prioritizing AI safety over market listing.

The declaration was made in Washington during corporate briefings amid growing calls from US lawmakers for stringent regulatory oversight of frontier AI systems.

Altman stated that even a single-digit probability of catastrophic human extinction risks from advanced AI makes commercial public market pressure unacceptable.

Leading AI laboratories are reportedly discussing an industry-wide pact to slow down rapid capability development until robust safety guardrails and evaluation metrics are established.

The development aligns with UPSC GS-3 Science and Technology issues concerning frontier AI governance, existential risk management, and self-regulatory mechanisms in tech sectors.



STORY 2 Times of India

Student Researcher Develops Empathy Distillation Method to Enhance Compact AI Models

High school researcher Henry Xie created a novel two-step fine-tuning technique that enables small artificial intelligence models to mimic empathetic communication.

The project was developed at Westview High School in Portland, Oregon, earning national finalist honors at the US Regeneron Science Talent Search.

Compact models trained with this empathy distillation technique outperformed standard smaller baselines in over 90 percent of comparative human evaluation tests.

Large language models possess high conversational empathy but require immense computational power, whereas smaller models lack emotional nuance when deployed locally on edge devices.

This scientific breakthrough relates to UPSC GS-3 Science and Technology, demonstrating cost-effective Model Knowledge Distillation techniques to build ethically aligned, resource-efficient AI tools.

UPSC RELEVANCE

Balancing frontier artificial intelligence capability growth with strict safety protocols and ethical distillation techniques for smaller models.

PRELIMS FACTS

- Frontier AI models refer to highly capable foundation models that can possess general capabilities and potentially pose systemic safety risks.
- Knowledge distillation in machine learning is a compression technique where a smaller 'student' model is trained to mimic the outputs of a larger 'teacher' model.
- Existential risk (X-risk) in technological ethics refers to scenarios where an emerging technology could cause human extinction or permanent collapse of civilization.

MAINS FRAMEWORK

Intro: The rapid advance of frontier artificial intelligence systems necessitates a dual approach: mitigating existential risks at the macro level while innovating lightweight, ethically aligned models for local deployment.

DIMENSIONS

- **Corporate Governance:** Commercial pressure vs safety priorities, leading to deferred public market listings.
- **Technological Innovation:** Knowledge distillation enabling smaller, energy-efficient models to achieve empathetic interaction.
- **Regulatory Oversight:** Growing international consensus on evaluating dual-use capabilities and preventing catastrophic outcomes.

Way forward: Establish statutory AI safety institutes, institute mandatory pre-deployment safety evaluations, and incentivize open research on model distillation and alignment.

PYQ LINK

Discuss the ethical and safety challenges posed by rapid progress in Artificial Intelligence and evaluate the role of regulatory guardrails.

KEY TERMS

Frontier AI Safety

Knowledge Distillation

Existential Risk (X-Risk)

Small Language Models (SLMs)

AI Alignment

ACTS & ARTICLES

Digital Personal Data Protection Act, 2023

NITI Aayog National Strategy for Artificial Intelligence

05

GS PAPER 3 - ENERGY SECURITY

Geopolitics of Global Energy Security and Refined Fuels



STORY 1 The Hindu

United States Urges Ukraine to Halt Refinery Strikes Amid Global Diesel Shortage

US President Donald Trump publicly requested Ukraine to cease long-range drone strikes on Russian oil refineries and fuel distribution networks.

The announcement was issued from Kyiv and Washington following unprecedented spikes in global energy markets and domestic fuel distribution channels.

Average US diesel prices surpassed \$6 per gallon after Ukrainian strikes damaged Russian refining capacity, forcing Moscow to ban diesel exports.

Disruptions in Russian fuel exports combined with Red Sea shipping bottlenecks via the Strait of Hormuz have created acute global middle-distillate shortages.

This development highlights UPSC GS-3 Energy Security and GS-2 International Relations, illustrating how localized military conflicts impact global supply chains and inflation.

UPSC RELEVANCE

Examining how military strikes on petroleum refining infrastructure disrupt global middle-distillate supply chains and trigger energy inflation.

PRELIMS FACTS

- Diesel and middle distillates form the primary fuel supply for global heavy transport, freight logistics, and industrial backup power generation.
- Export bans on refined petroleum products by major producer nations directly cause global supply squeezes and international crude oil price volatility.
- The Strait of Hormuz is a critical maritime choke point connecting the Persian Gulf with the Gulf of Oman and Arabian Sea, handling major global petroleum transit.

MAINS FRAMEWORK

Intro: Targeted strikes on oil processing facilities severely compress global middle-distillate supplies, exacerbating macroeconomic inflation across dependent economies.

DIMENSIONS

- **Market Impact:** Record surging diesel prices in consumer nations due to Russian export bans and reduced refining throughput.
- **Geopolitical Friction:** Strategic divergence between warring parties and external powers attempting to stabilize global energy pricing.
- **Maritime Choke Points:** Compound supply pressures resulting from disruptions in Red Sea shipping and the Strait of Hormuz.

Way forward: Diversify global refined fuel sourcing, build domestic strategic petroleum and middle-distillate reserves, and accelerate fuel transition in heavy freight.

PYQ LINK

Analyze the impact of geopolitical conflicts on global energy supply chains and discuss strategies for ensuring India's energy security.

KEY TERMS

Middle Distillates

Refining Infrastructure

Energy Inflation

Strait of Hormuz

Supply Chain Vulnerability

ACTS & ARTICLES

Integrated Energy Policy of India

Strategic Petroleum Reserve (SPR) Program



STORY 1 **The Hindu**

Saudi Civil Defence Lifts Hazard Alerts in Southern Cities Following Houthi Escalation

Saudi Arabia's Civil Defence Authority issued an all-clear notification, lifting emergency safety warnings across four major southern urban centers.

Emergency alerts were previously active in Najran, Khamis Mushait, Jazan, and Abha following cross-border aerial missile and drone threats.

The security threat escalated after Iran-aligned Houthi forces in Yemen declared a naval blockade against Riyadh and targeted Red Sea shipping vessels.

Houthi forces controlling northern Yemen have systematically expanded maritime and drone strikes, threatening critical infrastructure and commercial shipping lanes in the Arabian Peninsula.

The situation connects to UPSC GS-2 International Relations, impacting West Asian regional stability, energy corridor safety, and India's maritime security interests in the Indian Ocean.

UPSC RELEVANCE

Security threats in the Arabian Peninsula and Red Sea directly impact India's maritime trade, energy corridors, and diaspora security.

PRELIMS FACTS

- Najran, Jazan, Abha, and Khamis Mushait are major urban administrative centers located in the southern high-altitude and coastal region of Saudi Arabia bordering Yemen.
- Houthi forces control northern Yemen and strategic coastal zones along the Bab-el-Mandeb Strait connecting the Red Sea to the Gulf of Aden.
- Civil Defence alert protocols involve real-time emergency public warning systems activated during aerial projectile threats or industrial hazards.

MAINS FRAMEWORK

Intro: Escalating cross-border missile and drone activity in West Asia destabilizes civil populations and threatens vital sea lines of communication in the Indian Ocean region.

DIMENSIONS

- **Maritime Security:** Disruption of commercial shipping vessels and energy carriers in the Red Sea.

- **Civilian Vulnerability:** Emergency alerts and potential harm in border urban centers like Jazan and Najran.
- **Geopolitical Spillover:** Complex interactions between Iran-aligned regional actors, Gulf monarchies, and Western naval coalitions.

Way forward: Promote multilateral maritime security dialogues, reinforce civil defence infrastructure, and pursue diplomatic de-escalation channels in West Asia.

PYQ LINK

Evaluate the strategic significance of the Red Sea maritime route for India and discuss the security challenges posed by non-state actors in West Asia.

KEY TERMS

Houthi Movement

Red Sea Naval Blockade

Bab-el-Mandeb Strait

Civil Defence Security

Regional Stability

ACTS & ARTICLES

UN Security Council Resolution 2722 (Red Sea Shipping Safety)

UN Convention on the Law of the Sea (UNCLOS)

07

GS PAPER 2 - GOVERNANCE & SOCIAL JUSTICE

Governance Integrity, Recruitment Ethics, and Food Security



STORY 1 **The Hindu**

Opposition Leader Accuses State Government of Cover-Up in Public Examination Probe

Jharkhand Opposition Leader Babulal Marandi alleged political interference and protection of influential individuals in the ongoing CID probe into recruitment exam leaks.

The investigation concerns widespread paper leaks and irregularities in examinations conducted by the JPSC and JSSC in Ranchi, Jharkhand.

The Leader of the Opposition demanded an immediate CBI inquiry, pointing out procedural lapses such as the absence of mandatory videography during statement recording.

Repeated exam cancellations and recruitment malpractices have sparked widespread student protests and eroded public trust in state recruitment commissions.

This development directly links to UPSC GS-2 Governance, emphasizing the necessity of institutional transparency, fair recruitment, and statutory bodies like the Public Service Commission.



STORY 2 **The Hindu**

Delhi Government Expands Subsidised Atal Canteens to Serve Urban Vulnerable Populations

The Delhi government expanded its network of Atal Canteens, providing freshly cooked subsidized meals to thousands of daily wage earners and urban poor.

Operating across 100 strategic locations including Anand Vihar and Nehru Nagar in New Delhi, the canteens incorporate digital photo-verification counters.

Each meal is priced at ₹5, with the expanded network serving approximately 50,000 meals daily to informal sector workers and homeless individuals.

While the initiative significantly relieves hunger among marginalized groups, beneficiaries have raised concerns regarding food quality and operational hygiene standards.

The scheme aligns with UPSC GS-2 Social Justice and Food Security, illustrating state interventions to achieve SDG 2 (Zero Hunger) through targeted urban nutrition safety nets.

UPSC RELEVANCE

Analyzing institutional reforms in public examination processes alongside urban social safety nets to protect vulnerable populations.

PRELIMS FACTS

- State Public Service Commissions (SPSCs) are constitutional bodies established under Article 315 of the Constitution of India for conducting recruitment to state civil services.
- Sustainable Development Goal 2 (SDG 2) aims to end hunger, achieve food security, improve nutrition, and promote sustainable agriculture by 2030.
- Biometric and digital photo-verification mechanisms in welfare delivery help reduce ghost beneficiaries and curb leakages in public food distribution schemes.

MAINS FRAMEWORK

Intro: Preserving the sanctity of public service examinations and ensuring basic food security for informal workers are twin pillars of effective welfare governance.

DIMENSIONS

- **Institutional Accountability:** Preventing recruitment leaks, ensuring independent investigation, and restoring youth trust in state agencies.
- **Social Protection:** Providing affordable ₹5 meals to urban poor and ragpickers via Atal Canteens.
- **Implementation Quality:** Addressing beneficiaries' concerns regarding food quality, operational hygiene, and administrative hurdles.

Way forward: Enact standardized national anti-paper leak legislation and conduct mandatory third-party quality audits for state-subsidized urban canteen networks.

PYQ LINK

Discuss the measures necessary to ensure transparency and prevent malpractices in public recruitment examinations conducted by state commissions.

KEY TERMS

Recruitment Transparency

Public Service Commission

Urban Hunger

Targeted Subsidies

SDG 2 (Zero Hunger)

ACTS & ARTICLES

Article 315 to 323 (Public Service Commissions)

Public Examinations (Prevention of Unfair Means) Act, 2024

National Food Security Act (NFSA), 2013

08

GS PAPER 2 - COMPARATIVE POLITY

Comparative Constitutionalism and Devolution Dynamics



Devolved Leaders of Scotland, Wales, and Northern Ireland Convene to Discuss Constitutional Change

First Ministers representing pro-independence parties in Scotland, Wales, and Northern Ireland gathered in Cardiff to coordinate strategies for structural constitutional reform.

The summit convened leaders including John Swinney (SNP), Rhun ap Iorwerth (Plaid Cymru), and Mary Lou McDonald (Sinn Féin) in Cardiff, Wales.

The joint declaration urges the UK central government to formally prepare and facilitate constitutional mechanisms for self-determination and territorial devolution.

Regional electoral gains by nationalist parties have intensified pressure on Westminster, highlighting growing friction between central authority and devolved administrations.

For UPSC GS-2 Comparative Polity, this event offers key insights into asymmetric devolution, territorial integrity, and constitutional dynamics within federal and quasi-federal unions.

UPSC RELEVANCE

Examining asymmetric federalism and sub-national self-determination movements within established parliamentary democracies.

PRELIMS FACTS

- Devolution in the United Kingdom refers to the statutory granting of executive and legislative powers from the Parliament of the UK to regional assemblies in Scotland, Wales, and Northern Ireland.
- Sinn Féin, the Scottish National Party (SNP), and Plaid Cymru represent regional nationalist political parties in Northern Ireland, Scotland, and Wales respectively.
- Asymmetric federalism allows different sub-national units within a sovereign state to hold varying degrees of autonomy and legislative competence.

MAINS FRAMEWORK

Intro: Structural coordination among regional nationalist leaders highlights growing constitutional friction between central parliamentary sovereignty and sub-national demands for autonomy.

DIMENSIONS

- **Constitutional Structure:** Friction between central parliamentary authority in Westminster and devolved legislatures in Edinburgh, Cardiff, and Belfast.
- **Political Realignment:** Electoral victories of pro-independence regional parties driving requests for formal constitutional transition.
- **Comparative Relevance:** Contrasting UK devolution mechanisms with India's Union-State administrative framework under Schedule VII.

Way forward: Establish institutional inter-governmental forums to resolve inter-regional disputes and balance sub-national identity with national territorial integrity.

Compare the Indian constitutional scheme of federalism with that of the United Kingdom, specifically regarding the devolution of powers to sub-national units.

KEY TERMS

Devolution

Asymmetric Federalism

Constitutional Change

Sub-national Autonomy

Self-Determination

ACTS & ARTICLES

Scotland Act 1998 / Government of Wales Act 1998

Good Friday Agreement 1998

Article 1 & Schedule VII of the Indian Constitution



Practice MCQs (UPSC Prelims)

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

GS PAPER 3 - ENVIRONMENT & ECOLOGY

Ecological Restoration & Nature-Based Solutions

Palo Alto Builds Living Horizontal Levee to Reuse Wastewater and Mitigate Sea-Level Rise

Q1. With reference to nature-based coastal protection strategies, consider the following statements regarding 'Horizontal Levees': 1. They rely on steep concrete seawalls to resist high-energy storm surges. 2. They utilize gently sloping vegetated marshlands integrated with treated wastewater effluent to dissipate wave energy. 3. They help filter urban contaminants before wastewater enters marine ecosystems. Which of the statements given above is/are correct?

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

GS PAPER 3 - ENVIRONMENT & ECOLOGY

Invasive Alien Species and Ecosystem Conservation

Invasive Brushtail Possums Cause Severe Canopy Damage Across Vulnerable New Zealand Forests

Q2. Which of the following statements accurately describes the ecological threat posed by invasive alien species on island ecosystems? 1. Invasive species on isolated islands often face no natural predators, leading to uninhibited population growth. 2. Targeted eradication of invasive predators like black rats can lead to significant population recovery of endangered native species. 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

GS PAPER 3 - SCIENCE & TECHNOLOGY

Artificial Intelligence Governance and Safety Frameworks

Student Researcher Develops Empathy Distillation Method to Enhance Compact AI Models

Q3. In the context of Artificial Intelligence development, what does 'Knowledge Distillation' refer to?

- A. A process of converting unstructured natural language data into structured database tables.
- B. A technique where knowledge from a large, complex AI model is compressed into a smaller, more efficient model.
- C. A legal procedure for removing copyrighted text from machine learning training datasets.
- D. A physical hardware cooling mechanism used in deep learning supercomputers.

GS PAPER 3 - ENERGY SECURITY

Geopolitics of Global Energy Security and Refined Fuels

United States Urges Ukraine to Halt Refinery Strikes Amid Global Diesel Shortage

Q4. Consider the following statements regarding global diesel and refined fuel supply chains: 1. Diesel fuel availability is critical for heavy freight transportation, agriculture, and industrial energy supply. 2. Attacks on oil refining infrastructure reduce global middle-distillate supplies, exacerbating domestic fuel inflation. 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

GS PAPER 2 - GOVERNANCE & SOCIAL JUSTICE

Governance Integrity, Recruitment Ethics, and Food Security

Delhi Government Expands Subsidised Atal Canteens to Serve Urban Vulnerable Populations

Q5. With reference to public welfare and food security initiatives in urban centers, consider the following statements: 1. Atal Canteens in Delhi provide subsidized meals at ₹5 per meal to target urban vulnerable and informal workers. 2. Biometric and photo-verification systems at food distribution canteens help track operational metrics and prevent service duplication. 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

GS PAPER 2 - COMPARATIVE POLITY

Comparative Constitutionalism and Devolution Dynamics

Devolved Leaders of Scotland, Wales, and Northern Ireland Convene to Discuss Constitutional Change

Q6. In comparative political systems, the concept of 'Devolution' is best described as:

- A. The constitutional dissolution of regional assemblies to centralize power in a national parliament.
- B. The statutory delegation of executive and legislative powers from a central government to sub-national regional administrations.
- C. The judicial review process through which federal courts overturn regional legislation.
- D. An international treaty mechanism for settling boundary disputes between sovereign nations.

Answer Key — Practice MCQs

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

Q1: B

Q2: C

Q3: B

Q4: C

Q5: C

Q6: B

Q1 Option B · 2 and 3 only

Statement 1 is incorrect because horizontal levees move away from rigid concrete seawalls, using gently sloping vegetated living landscapes instead. Statements 2 and 3 are correct as horizontal levees combine native marsh plants with treated wastewater effluent to naturally filter pollutants and reduce wave impact.

Q2 Option C · Both 1 and 2

Both statements are correct. Island ecosystems are highly vulnerable to invasive alien species due to the absence of natural predators. Eradication of invasive black rats on Caribbean islands enabled the Antiguan racer snake population to grow from 51 to over 1,100.

Q3

Option B · A technique where knowledge from a large, complex AI model is compressed into a smaller, more efficient model.

Knowledge distillation is an AI compression technique where a smaller, computationally efficient student model is trained using the outputs and representations of a much larger teacher model, enabling advanced capabilities on smaller hardware.

Q4 Option C · Both 1 and 2

Both statements are correct. Diesel is an essential middle distillate powering global freight and industry. Ukrainian long-range strikes on Russian refineries triggered fuel rationing and export bans, driving global diesel prices past \$6 a gallon.

Q5 Option C · Both 1 and 2

Both statements are correct. Delhi's Atal Canteens offer ₹5 meals to urban poor and daily wage workers across 100 locations, utilizing digital camera/photo verification to manage service logs and attendance.

Q6

Option B · The statutory delegation of executive and legislative powers from a central government to sub-national regional administrations.

Devolution refers to the statutory granting of powers from the central authority of a sovereign state to government at a sub-national level, such as the regional parliaments/assemblies in Scotland, Wales, and Northern Ireland within the UK.