05th February 2026: DSC

Uttarakhand Opens Nanda Devi & 82 Other Peaks

Syllabus Tagging:

- **GS 1:** Geography (Himalayan Ecosystem, Landslides/Disasters)
- **GS 3:** Economy (Tourism), Environment (Conservation vs Development)

1. Why in News?

The Uttarakhand government has opened **83 Himalayan peaks** (ranging from 5,700–7,756 m) for mountaineering. This includes iconic peaks like **Mt. Kamet, Nanda Devi East, and Trishul**, signaling a shift toward regulated high-altitude tourism.

2. Key Highlights

- **Scope:** 83 peaks opened to domestic and foreign climbers to promote adventure tourism.
- **Incentives:** Waiver of peak fees, camping fees, and environmental fees to reduce entry barriers.
- **Governance:** Launch of a **fully digital permission system** to improve transparency and monitoring.

3. Analysis (Mains Perspective)

A. Significance (The "Pros")

- **Economic Diversification:** Moves beyond seasonal pilgrimage (Char Dham) to **high-value, low-volume** adventure tourism (spending by climbers is significantly higher).
- **Livelihood Generation:** Creates employment for locals as guides, porters, and equipment renters, curbing distress migration from hill districts.
- **Global Competitiveness:** Positions Uttarakhand against Nepal by reducing bureaucratic friction and opening technical peaks.

B. Challenges & Concerns (The "Cons")

- **Ecological Fragility:** The region is tectonically active and prone to disasters (e.g., **2021 Rishi Ganga floods**). Increased footfall risks glacial instability.
- **Waste Management:** "Leave No Trace" principles are hard to enforce; waste accumulation in pristine alpine zones is a major risk.
- **Safety Infrastructure:** Lack of adequate high-altitude rescue teams and trauma care facilities increases risk for climbers.
- **Financial Impact:** Fee waivers may reduce the dedicated funds available for environmental restoration.

4. Way Forward

- **Scientific Limits:** Conduct **carrying-capacity studies** for each peak to cap expedition numbers.

- **Green Regulation:** Implement strict **waste buy-back policies** and mandatory environmental bonds.
- **Porter Welfare:** Institutionalize insurance and safety training for local support staff.
- **Disaster Tech:** Integrate early-warning systems and strengthen rescue infrastructure (in coordination with ITBP/NDRF).

Turtle Trails (Union Budget Announcement)

Syllabus Tagging:

- **GS 3:** Environment & Biodiversity (Conservation), Economy (Sustainable Tourism)
- **GS 1:** Geography (Coastal Resources)

1. Why in News?

The Union Budget announced **'Turtle Trails'** to promote tourism along nesting coasts in **Odisha, Karnataka, and Kerala**. This has raised alarm among conservationists regarding the protection of Olive Ridley nesting sites (like Gahirmatha and Rushikulya).

2. Key Highlights

- **Target Species: Olive Ridley Turtles** (IUCN Status: *Vulnerable*; WPA 1972: *Schedule I*).
- **Phenomenon:** Famous for **'Arribada'** (mass nesting) where thousands of females return to natal beaches.
- **Objective:** To leverage coastal biodiversity for tourism and local economic growth.

3. Analysis (Mains Perspective)

A. Potential Benefits

- **Community Economy:** Can provide alternative livelihoods for fishing communities (as guides/homestay owners).
- **Awareness:** Regulated eco-tourism can foster conservation values among the public.

B. Critical Issues

- **Ecological Disruption:** Turtles are sensitive to light and noise. Artificial lighting can **disorient hatchlings**, preventing them from reaching the sea.
- **Habitat Degradation:** Tourism infrastructure may violate **CRZ (Coastal Regulation Zone)** norms and degrade nesting beaches.
- **Legal Conflict:** Unregulated access contradicts the high protection status (Schedule I) mandated by the Wildlife Protection Act, 1972.
- **Ambiguity:** Lack of clarity on what "Turtle Trails" entails (infrastructure vs. nature walks).

4. Way Forward

- **Strict Protocols:** Establish **"Dark Sky"** zones near beaches and enforce strict visitor caps during nesting seasons.
- **Community Stewardship:** Adopt a community-led model where locals have an economic stake in *protecting* the turtles (e.g., the Velas Turtle Festival model in Maharashtra).
- **Buffer Zones:** Maintain strict **no-construction buffer zones** to preserve beach morphology.
- **Precautionary Principle:** Tourism must remain secondary to conservation; any commercial activity should be preceded by a rigorous EIA (Environmental Impact Assessment).

SC Questions WhatsApp & Meta on Personal Data

Syllabus Tagging:

- **GS 2:** Polity (Right to Privacy - Article 21), Governance (Digital Regulation).
- **GS 3:** Economy (Digital Economy, Data as an Asset).

1. Why in News?

The Supreme Court (2026) has questioned **WhatsApp and Meta** regarding the sharing and commercial use of user data. The Court warned against violating the **Article 21 privacy rights** of millions of "silent consumers" in India, referencing a challenge against a **₹213.14 crore CCI penalty (2023)** imposed for abuse of dominance.

2. Key Highlights

- **The Core Issue:** WhatsApp's 2021 privacy policy update forced users to share data with Meta (Facebook) to continue using the service.
- **Judicial Observation:** The SC remarked that data carries **economic value**, rejecting the argument that it is merely a privacy concern. It called for a comparison between India's laws and the **EU's stricter regulations** (GDPR/DSA).
- **Market Context:** With **500+ million users**, India is WhatsApp's largest market, making this data a critical economic asset for global tech firms.

3. Analysis (Mains Perspective)

A. Significance (The "Why")

- **Surveillance Capitalism:** Highlights the risks of a model where user behavior is tracked and monetized for predictive advertising (a concept by *Shoshana Zuboff*).
- **Constitutional Rights:** Reaffirms the **K.S. Puttaswamy (2017)** judgment, emphasizing "informational self-determination."
- **Regulatory Convergence:** Signals a shift toward linking privacy with competition law (anti-trust) and consumer protection.

B. Challenges & Concerns

- **Consent Fatigue:** Over 90% of users accept privacy policies without reading them, rendering "informed consent" a legal fiction.
- **Fragmented Oversight:** Regulation is split between **MeitY** (policy), **CCI** (market dominance), and **TRAI** (telecom), creating gaps.
- **DPDP Act Limitations:** The *Digital Personal Data Protection Act, 2023* focuses on privacy harms but lacks explicit provisions on **data valuation** or **algorithmic accountability**.

4. Way Forward

- **Granular Consent:** Mandate simplified, multilingual consent dashboards that allow users to opt-out of specific data sharing without losing access.
- **Data Valuation Framework:** Develop policies to recognize data as a national economic resource.
- **Institutional Reform:** Strengthen the **Data Protection Board** and ensure coordination between CCI and MeitY.

SC Has Not Upheld Death Penalty in 3 Years

Syllabus Tagging:

- **GS 2:** Polity (Judiciary, Criminal Justice System), Social Justice (Human Rights).

1. Why in News?

A **NALSA–NALSAR Square Circle Clinic report (2025)** reveals that the Supreme Court has **not confirmed any death sentence** in the last three years (2023–2025). In 2025 alone, there were **10 acquittals** by the SC, the highest in a decade.

2. Key Highlights

- **Trial vs. Appellate Disconnect:**
  - **Sessions Courts (2016–2025):** Imposed **1,310 death sentences**.
  - **High Courts:** Confirmed only **8.31%**; the rest were commuted or acquitted.
  - **Supreme Court (Last 3 Years): Zero confirmations**, 15 acquittals, 14 commutations.
- **Current Status:** As of 2025, **574 prisoners** (550 men, 24 women) are on death row, with many facing prolonged incarceration ("Death Row Phenomenon").

3. Analysis (Mains Perspective)

A. Key Issues

- **Systemic Failure:** High acquittal rates at the top signal poor evidence appreciation and "broken" investigations at the trial level.

- **Violation of Guidelines:** Nearly 95% of trial court sentences in 2025 violated the **Manoj v. State of MP (2022)** guidelines, which mandate psychological evaluations and mitigation studies *before* sentencing.
- **Inequality:** The penalty disproportionately affects the economically vulnerable who lack quality legal representation.

B. Ethical Dimension

- **Retributive vs. Reformative:** The trend shows a judicial shift away from pure retribution toward reformative justice, aligning with the global abolitionist movement (140+ countries).

4. Way Forward

- **Mitigation Investigation:** Institutionalize "Mitigation Units" to gather socio-economic and psychological data for the accused.
- **Strict Compliance:** High Courts must remand cases if trial courts fail to follow the *Manoj* guidelines.
- **Policy Shift:** Consider the Law Commission's recommendation for **progressive abolition** (retaining it only for terrorism/waging war).

Solid Fuel Ducted Ramjet (SFDR)

Syllabus Tagging:

- **GS 3:** Science & Technology (Indigenization, Missile Tech), Security (Defence Capabilities).

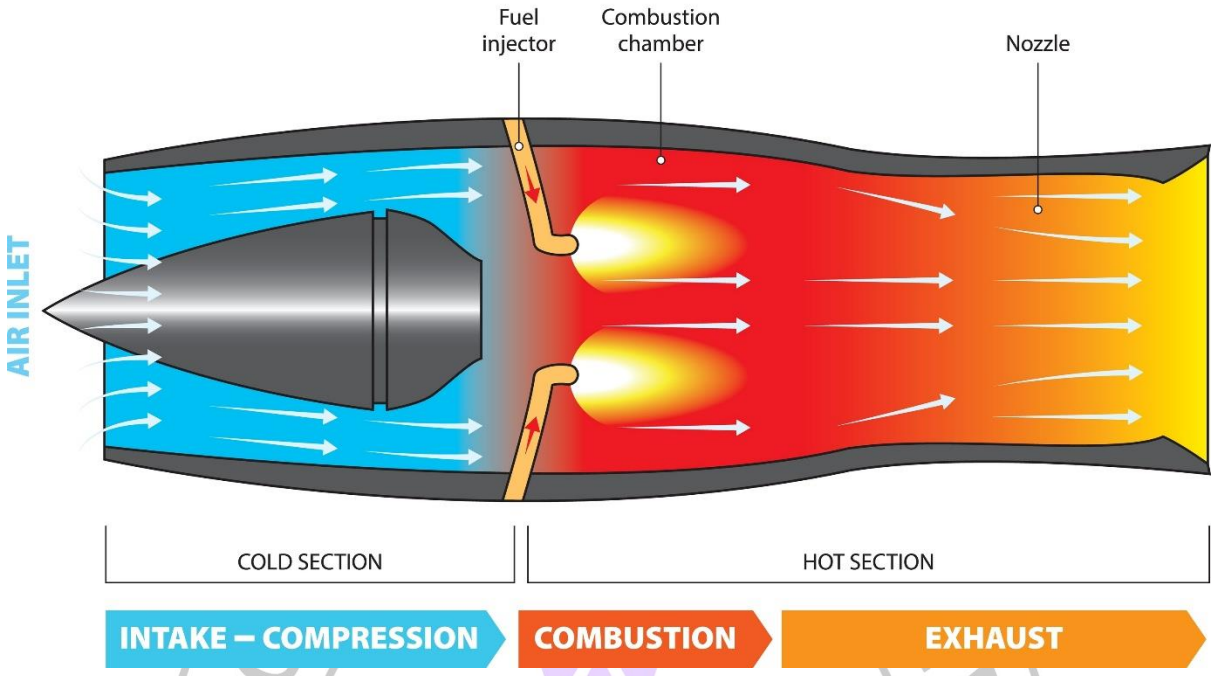
1. Why in News?

DRDO successfully demonstrated the **Solid Fuel Ducted Ramjet (SFDR)** technology from ITR Chandipur, Odisha. This places India in an elite group of nations (like the USA and Russia) possessing the tech for **next-gen long-range air-to-air missiles**.

2. Key Highlights

- **The Tech:** Unlike standard rockets that carry their own oxidizer, SFDR uses **atmospheric oxygen** for combustion (ramjet principle).
- **Performance:** Enables sustained **supersonic speeds** and extended range during the cruise phase.
- **Application:** Critical for **Beyond-Visual-Range (BVR)** missiles (e.g., future Astra variants).

RAMJET ENGINE cross section



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Explore

3. Analysis (Mains Perspective)

A. Strategic Advantages

- **No-Escape Zone:** The sustained thrust allows the missile to maintain high energy at the terminal phase, making it nearly impossible for enemy aircraft to evade.
- **Deterrence:** Counter-balances the advanced air-combat capabilities of adversaries like China and Pakistan.
- **Aatmanirbhar Bharat:** Reduces reliance on expensive imported missile systems (like the Meteor).

B. Challenges

- **Engineering Complexity:** Requires precise control of air intake and combustion at supersonic speeds.
- **Transition:** Moving from "technology demonstration" to a fully operational, deployable missile system (user trials) is time-consuming and costly.

4. Way Forward

- **Integration:** Accelerate the integration of SFDR into the **Astra Mk-III** program.
- **Collaboration:** Deepen public-private partnerships (DRDO + Industry) for materials and manufacturing.
- **Infrastructure:** Invest in high-speed wind tunnels and simulation tech to reduce testing cycles.

Mains Practice Question

Q. "The recent trend of high acquittals in death penalty cases by the Supreme Court exposes deep fissures in India's trial-level criminal justice system." Analyze this statement in light of the 'rarest of rare' doctrine and recent judicial guidelines. (15 Marks, 250 Words)

AMR Dipstick Test

Why in News

- Scientists at THSTI, Faridabad have developed a **low-cost dipstick assay** to detect antimicrobial resistance (AMR) genes in sewage.
- Study published in *Nature Communications* (December 2025) validated the test across **381 sewage sites in six Indian states**.
- Cost per test: **₹400–550**, compared to **₹9,000+** for shotgun sequencing, enabling large-scale surveillance.

Relevance

- **GS2 (Health):** AMR governance, public health surveillance
- **GS3 (Science & Technology):** Biotechnology innovation
- **GS3 (Environment):** One Health approach, wastewater surveillance

Basics and Background

- **Antimicrobial Resistance (AMR):** Ability of microbes to survive antibiotic treatment, making infections harder to cure.
- Leads to increased **morbidity, mortality, and healthcare costs** globally.
- Major drivers:
    - Overuse/misuse of antibiotics in humans and livestock
    - Agricultural practices
    - Pharmaceutical effluents
    - Inadequate wastewater treatment, especially in developing countries
- **Sewage surveillance** captures aggregated signals from households, hospitals, farms, and industries.

Scientific and Technological Dimension

- Dipstick functions like a **rapid diagnostic test**.
- Detects amplified resistance genes from sewage DNA using **PCR-based amplification**.
- Shows **visible colour-band readouts**.

- Key features:
    - Detects **16 resistance genes** per test
    - Results available within **2 hours**
    - Field-friendly; no advanced lab infrastructure needed
- Platform can be **updated within 3 days** to include new resistance genes.

Public Health and Governance Dimension

- India recognised by WHO as a **global AMR hotspot** due to:
    - High infectious disease burden
    - Easy, often unregulated access to antibiotics
- AMR threatens:
    - Surgeries
    - Chemotherapy
    - Organ transplants
- Supports objectives of **National Action Plan on AMR (NAP-AMR)**, especially surveillance and containment.

Economic Dimension

- Global estimates:
    - **10 million deaths annually by 2050**
    - **2–3.5% reduction in global GDP**
- Affordable surveillance enables:
    - Early interventions
    - Rational antibiotic stewardship
    - Lower long-term healthcare expenditure
- Particularly important for **LMICs**, where genomic surveillance is costly.

Social and Ethical Dimension

- Sewage surveillance is **ethically acceptable**:
    - Anonymous, community-level data
    - No individual identification
- Protects vulnerable populations with limited healthcare access.
- Reinforces **One Health framework** (human–animal–environment interface).

Data and Evidence

- Sewage samples analysed from:

  - Assam, Haryana, Jharkhand, Uttar Pradesh, Uttarakhand, West Bengal
- Findings:
  - Widespread antibiotic residues
  - High prevalence of resistance genes
- India among **highest antibiotic consumers globally**.
- Only a **small fraction of wastewater** is effectively treated.

Limitations and Cautions

- Gene detection indicates **potential resistance**, not live pathogenic organisms.
- Resistance expression depends on:
  - Gene combinations
  - Ecological context
- Dipsticks **complement** but do not replace:
  - Culture-based diagnostics
  - Genomic surveillance

Way Forward

- Integrate dipstick surveillance into:
  - Urban wastewater monitoring
  - Public health and Jal Shakti frameworks
- Link data with:
  - Antibiotic stewardship programmes
  - Pharmaceutical effluent regulation
- Expand:
  - AMR laboratories
  - Genomic surveillance capacity
- Upgrade wastewater treatment infrastructure.
- Promote global data sharing under **WHO–GLASS**.

Preventable Cancers in India

Why in News

- WHO–IARC linked study estimates **~40% of cancers in India are preventable**.
- Study analysed **30 preventable cancers** using Indian exposure data on:

  - Tobacco, alcohol, obesity
  - Infections, diet, pollution
- Provides evidence base for targeted cancer-prevention policies.

Relevance

- **GS2 (Health):** Non-communicable disease (NCD) prevention
- **GS1 (Society):** Lifestyle-related diseases
- **GS3 (Environment):** Pollution–health linkage

Basics and Background

- Cancer caused by **uncontrolled cell growth** due to genetic mutations.
- Risk arises from interaction of:
  - Lifestyle factors
  - Environmental exposure
  - Infections
  - Ageing
- **Primary prevention:** Reducing risk factors before disease onset.
- **Secondary prevention:** Screening and early detection after disease begins.

Key Findings and Data

- **37% of new cancer cases in 2022** (~14 lakh cases) attributable to preventable risk factors.
- Gender-wise burden:
  - Men: **50.6% preventable**
  - Women: **30.3% preventable**
- Major contributors:
  - Tobacco: **13.4%**
  - Infections (HPV, Hepatitis B/C, *H. pylori*): **13.4%**
  - Alcohol: **6.4%**
  - Obesity: **5.7%**
  - Air pollution: **3.9%**

Public Health and Governance Dimension

- Rising cancer burden due to:
  - Epidemiological transition
  - Ageing population

    - Urban lifestyles
- Increases pressure on limited oncology infrastructure.
- Aligns with **NPCDCS** focus on:
    - Screening
    - Awareness
    - Lifestyle modification
- Prevention is more **cost-effective** than tertiary cancer care.

Social and Behavioural Dimension

- High-risk behaviours shaped by:
    - Socio-economic conditions
    - Cultural norms
- Key challenges:
    - Smoking and smokeless tobacco use
    - Poor diet
    - Sedentary lifestyle
- Low awareness and late diagnosis worsen outcomes among poorer groups.

Environmental Dimension

- Air pollution responsible for nearly **4% of cancers**, especially lung cancer.
- Sources:
    - Industrial emissions
    - Vehicular pollution
    - Biomass burning
- Highlights need for environmental regulation as part of NCD policy.

Global and Comparative Perspective

- WHO estimates **30–50% of global cancers** are preventable.
- India has:
    - Higher tobacco-related burden
    - Higher infection-linked cancers
- Countries with:
    - Strong tobacco control
    - Widespread HPV vaccination

  show declining cancer incidence.

Challenges and Gaps

- Weak enforcement of tobacco and alcohol laws.
- Limited HPV and Hepatitis B vaccination coverage.
- Inconsistent urban air-pollution control.
- Behavioural change slow due to addiction and social acceptance.

Way Forward

- Strengthen:
    - Tobacco taxation
    - Plain packaging
    - Cessation services
- Expand HPV and Hepatitis B vaccination under UIP.
- Integrate cancer prevention into:
    - Ayushman Bharat–Health and Wellness Centres
- Enforce air-quality standards.
- Invest in mass awareness on:
    - Diet
    - Exercise
    - Alcohol risks

Sundarbans Tourism & Climate Loss

Why in News

- Debate arose after Union Environment Minister termed Sundarbans tourism as **under-exploited**, comparing visitor numbers with Ranthambore.
- Experts caution that **ecological fragility**, not tourist numbers, should guide tourism policy.
- Issue linked to **climate-induced loss and damage (L&D)** and livelihood diversification.

Relevance

- **GS1 (Geography):** Mangroves and coastal vulnerability
- **GS2 (Governance):** Climate adaptation, disaster management
- **GS3 (Environment):** Climate change and biodiversity

Basics and Background

- Sundarbans:
  - World's largest contiguous mangrove forest (~19,000 sq km)
  - UNESCO World Heritage Site
- Indian Sundarbans:
  - ~4,000 sq km in West Bengal
  - Home to **4.5+ million people**
- Livelihoods:
  - Agriculture
  - Fishing
  - Forest-based activities
- Region is:
  - Low-lying
  - Tidally influenced
  - Cyclone-prone

Climate Vulnerability and Loss–Damage Context

- Increased frequency and intensity of:
  - Cyclones
  - Floods
  - Storm surges
- Study across 48 islands:
  - Agriculture impact score: **4.27/5**
  - Fishery impact score: **2.52/5**
- Nearly **60% households** reported migration due to climate stress.

Non-Economic Loss and Damage (NELD)

- Includes:
  - Psychological trauma
  - Cultural loss
  - Social disruption
  - Educational discontinuity
- Study findings:
  - Students experienced ~4 cyclones on average

  - ~60 showed persistent trauma and anxiety
- Reported impacts:
  - Land productivity loss
  - House damage
  - School disruption

Tourism Potential: Opportunities

- Eco-tourism can:
  - Diversify livelihoods
  - Reduce dependence on climate-sensitive sectors
- Community-based tourism supports:
  - Local guides
  - Boat operators
  - Homestays
  - Handicrafts
- Conservation-linked tourism aligns ecology with economy.

Ecological and Governance Risks

- Carrying capacity **not scientifically assessed**.
- Mangroves act as:
  - Natural coastal buffers
- Disturbance weakens storm protection.
- Illegal tourism violates:
  - CRZ norms
  - NGT orders

Comparative Perspective

- Comparison with Ranthambore is flawed:
  - Sundarbans: riverine, dispersed, boat-based tourism
  - Ranthambore: terrestrial, safari-based tourism
- Wildlife sightings in Sundarbans are uncertain, limiting scale.
- Tourism models must reflect:
  - Ecosystem type
  - Hazard exposure
  - Population density

Institutional and Funding Dimension

- Sundarbans hold **42% of India's mangrove cover**.
- West Bengal reportedly receives lower central conservation funding.
- Expansion as a major tiger reserve needs balanced tourism policy.
- Climate adaptation and conservation finance remain critical.

Challenges and Criticisms

- Risk of over-commercialisation in fragile delta.
- Tourism income:
  - Seasonal
  - Unevenly distributed
- Infrastructure expansion increases:
  - Ecological footprint
  - Disaster vulnerability

Way Forward

- Conduct scientific:
  - Carrying-capacity assessments
  - Vulnerability studies
- Promote **low-impact, community-led eco-tourism**.
- Strict enforcement of:
  - CRZ regulations
  - NGT directives
  - Mangrove protection laws
- Integrate tourism with:
  - Climate adaptation planning
  - Disaster-resilient infrastructure
- Channel climate finance towards:
  - Livelihood diversification
  - Education
  - Mental health support

05th February 2026: Daily MCQs

Q1. With reference to the AMR Dipstick Test recently developed in India, consider the following statements:

1. It detects antimicrobial resistance genes directly from sewage samples.
2. It relies on whole-genome shotgun sequencing for gene identification.
3. It provides results within a few hours without requiring advanced laboratory infrastructure.

Which of the statements given above is/are correct?

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

Answer: B

Explanation:

- Statement 1 is correct: The dipstick detects AMR genes from sewage DNA.
- Statement 2 is incorrect: It uses PCR-based amplification, not expensive shotgun sequencing.
- Statement 3 is correct: Results are available within about two hours and are field-friendly.

Q2. Antimicrobial resistance (AMR) surveillance through sewage analysis is significant because:

1. It captures community-level antibiotic use and resistance trends.
2. It allows individual-level identification of antibiotic misuse.
3. It aligns with the One Health approach.

Which of the statements given above is/are correct?

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

Answer: B

Explanation:

- Statement 1 is correct: Sewage reflects aggregated signals from communities.
- Statement 2 is incorrect: Sewage surveillance is anonymous and does not identify individuals.
- Statement 3 is correct: It integrates human, animal, and environmental health.

Q3. According to recent WHO–IARC linked estimates, which of the following are major preventable contributors to India's cancer burden?

1. Tobacco use
2. Infectious agents such as HPV and Hepatitis B
3. Genetic inheritance as the dominant factor

Select the correct answer using the code below:

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

Answer: A

Explanation:

- Tobacco and infections together account for a large share of preventable cancers in India.
- Genetic inheritance alone is not the dominant preventable factor and cannot be modified at population level.

Q4. Which of the following best explains why comparisons between tourism in the Sundarbans and Ranthambore are considered ecologically inappropriate?

A. Sundarbans has lower biodiversity than Ranthambore
B. Tourism in Sundarbans is entirely restricted by law
C. Sundarbans is a riverine, mangrove ecosystem with dispersed settlements and boat-based access
D. Ranthambore receives international tourists while Sundarbans does not

Answer: C

Explanation:

- Sundarbans is a fragile, low-lying mangrove delta requiring low-density, boat-based tourism, unlike terrestrial safari-based tourism in Ranthambore.

Q5. Consider the following statements regarding Non-Economic Loss and Damage (NELD) in climate-vulnerable regions like the Sundarbans:

1. It includes psychological trauma and cultural disruption.
2. It is fully captured in GDP-based damage assessments.
3. It disproportionately affects children and marginalised communities.

Which of the statements given above is/are correct?

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

Answer: B

Explanation:

- Statement 1 is correct: NELD covers intangible losses like trauma and cultural erosion.
- Statement 2 is incorrect: GDP-based assessments largely ignore non-economic losses.
- Statement 3 is correct: Children and vulnerable groups experience higher long-term impacts.

Mains: Antimicrobial resistance (AMR) is increasingly being viewed as an environmental and governance challenge rather than merely a medical issue. Examine how wastewater-based surveillance tools such as sewage dipstick assays can strengthen India's AMR containment strategy. (250 words)