MAINS TEST SERIES
(Answer Booklet)

Roll No.	26-403
OPSC ROLL NO.	200296
Name	ABHIPSA DAS
Test No.	TEST-I
Subject:	G-S-I
Date:	15/10/25

Question Paper Specific Instructions

- All questions are printed in **English**.
- All the questions are **compulsory**
- The number of marks carried by each question (or part) is indicated in the question paper.
- **Word limit** in questions wherever specified should be adhered to.
- Any page or portion of the Page left blank in the Answer booklet must be clearly stuck off

Q No.	Marks obtained	Q No.	Marks obtained	Q No.	Marks obtained
1	5.5	8	5	15	7.5
2	6	9	3.75	16	—
3	—	10	4	17	—
4	5.75	11	—	18	
5	6	12	4.5	19	
6	5.25	13	6	20	
7	4.5	14	6.75		
				TOTAL	70.5

Dear Aspirants,

(1) You have good hold on content but try to attempt all questions in given time limit.

(2) Stick to the basic structure i.e Intro, Body (bullet points, headings, examples, data, maps), Conclusion.

(3) Rather than stressing single dimension do approach in a balanced manner.

(4) Do include mix of static and dynamic elements.

(5) Focus on wordlimit and maintain neatness in your answer.

Keep writing

All the Best.

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Page No.

5.5

GROUP-A

Q1) Temple architecture forms an indispensible part of our social, cultural and religious heritage - amongst the various forms Nagara and Dravidian styles deserve due mention.

Key Differences between the two:

NAGARA STYLE	DRAVIDIAN STYLE
i) popular in Northern, central and eastern regions	i) mainly confined to southern temples.
ii) generally gopurams (arched gateways) are absent	ii) extensively carved tall gopurams present
iii) The materials used are generally stones	iii) Gold is widely used for construction.
iv) Water tank/ reservoirs in the premises is rare.	iv) Water tank is a common occurence
v) The subschools under it are: - Kalinga school - Khajuraho school - Maru Gujara school.	v) It lacks such subschools.

Better write question no. outside the margin

Relevent Introduction

has curvilinear shikhara. [e.g.] Lingaraja vs Brihadeshwara

has pyramidal vimana.

enclosed by high walls. [e.g.] Konark vs Madurai Meenakshi

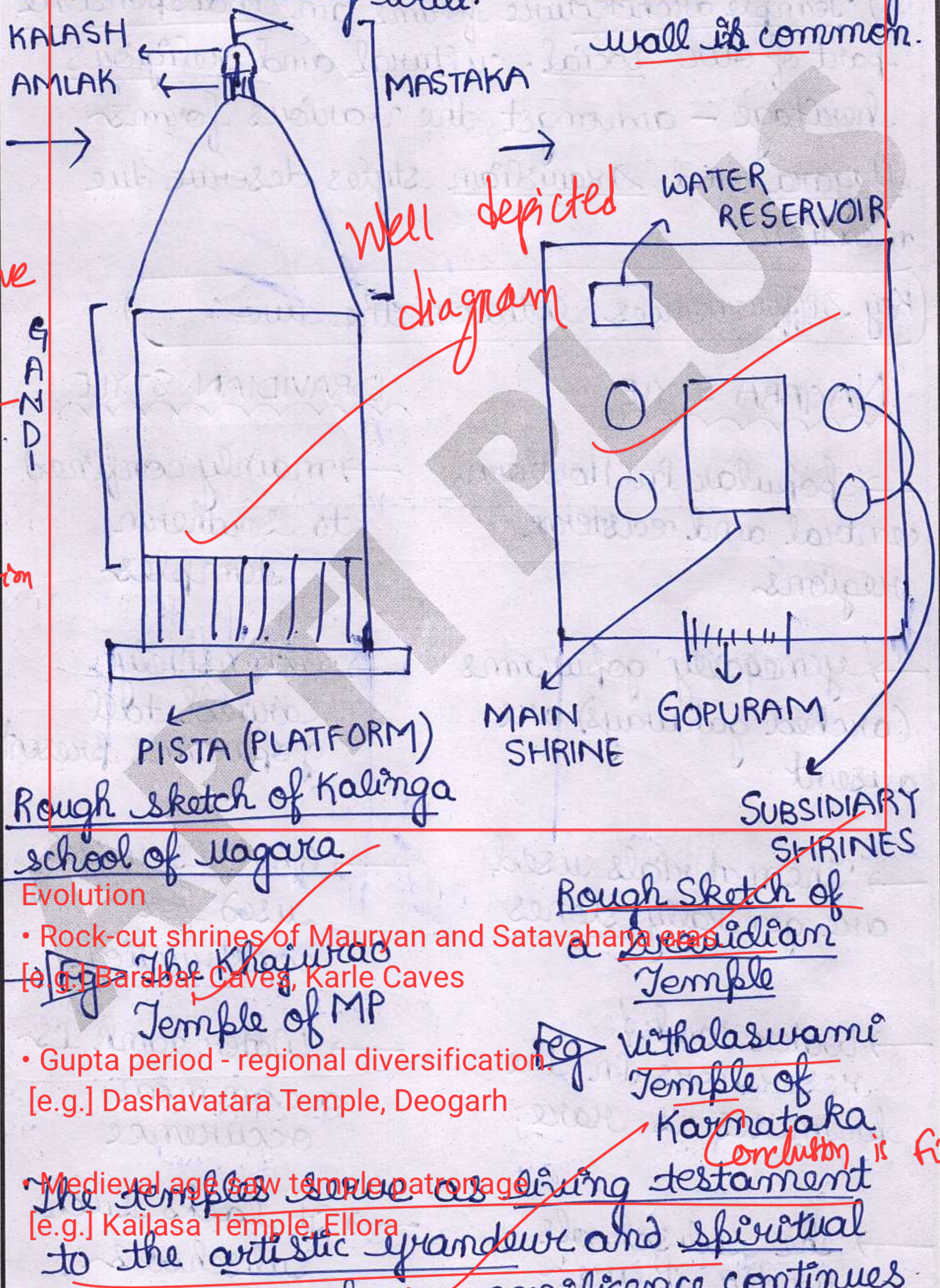
has multiple small mandapas. [e.g.] Khajuraho vs Kanchipuram

has axial mandapas.

Include example

Good you have explored through tabular manner

VI → The temples generally lack a boundary wall. → extensively carved boundary wall is common.



You have missed 1st part of the answer i-e Evolution

well depicted diagram

Rough sketch of Kalinga school of Nagara

Rough Sketch of a Dravidian Temple

Evolution

- Rock-cut shrines of Mauryan and Satavahana eras.
  [e.g.] Barabar Caves, Karle Caves
- Gupta period - regional diversification.
  [e.g.] Dashavatara Temple, Deogarh
- Medieval age saw temple patronage.
  [e.g.] Kailasa Temple, Ellora

[e.g.] The Khajuraho Temple of MP

[e.g.] Vithalaswami Temple of Karnataka

Conclusion is fine

The temples serve as lasting testament to the artistic grandeur and spiritual symbolism whose magnificence continues till date

6

Well written Introduction

2) Bhakti movement developed around 7th C CE in the South and later spread to North-India around 15th C CE. Heralding an era of religious renaissance, it plays an indispensible role in development of regional music across India.

ROLE IN DEVELOPMENT OF REGIONAL MUSIC AND SINGING

good use of heading

1. Spread of vernacular language

Eg The Dohas of Kabir are in regional languages

Better to use numerical points rather than Symbols

Local Vernacular Promotion:

2. Reflection of a high level of devotion.

Eg The bhajans composed by Mirabai

• Evolution of Musical Forms:

3. [e.g.] Abhang, Kirtan, Bhajan.

Promotion of inter-religious harmony

Eg Salabega (a muslim poet) composing bhajans on Shri Jagannath.

Good that you have strengthen your points with examples

• Temple and Community Singing:

4. [e.g.] Harikatha, Namasankirtana.

Spread inclusivity and community worship.

Eg The sankirtanas of Shri Chaitanya included people from all sections

5. Popularization of songs on local deities

Eg Lord Murugan worshipped by Kurinji (hunters)

GURU NANAK (PU)
MIRABAI (RJ)
well depicted map
(W.B)
(M.H)
Better to explore the place name too
SANT TUKARAM
SRI CHAITANYA, JAYADEVA

A rough sketch of distribution of Bhakti saints

the path of nirvana accessible to all
focus on devotion over caste rigidities

IMPACT OF BHAKTI SONGS ON SOCIETY

good use flow chart

Can include:
- Ek Bharat Shreshtha Bharat (2016) promotes inter-state cultural exchange inspired by Bhakti unity.

promotion of caste integration
Eg congregational worship

opposition of ritual exclusivity
Eg rituals done by lower caste.

Bhakti is the bridge between soul and sound.
– Rabindranath Tagore

Contextual
Conclusion

The Bhakti songs based on the concept of universal devotion reinforce that the worship of Shri Krishna transcends all caste boundaries

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Q4. Buddhism in India can be heralded to be an area of religious renaissance popularized by dynasties such as Mauryans. Their tenents have played an indispensible role in transforming the moral and religious life of people

Q. 5.75

Apt

Introduction

CORE TENETS OF BUDDHISM

→ The Buddhists followed a middle path in life.

- **Eightfold Path:**
[e.g.] Right Conduct, Right Speech, Right Mindfulness

↳ disregarded extreme forms of asceticism

Eg against the use of extreme indulgence or extreme abstinence.

- **Doctrine of Dependent Origination.**
[e.g.] *Prattityasamutpada, Anitya.*

→ Non-violence/ahimsa is a core belief of Buddhism

- **Concept of NO-Self (Anatta):**
[e.g.] Five Aggregates, *Skandhas.*

↳ belief that "each and every form of life is unique"

- **Middle Path:**
[e.g.] Siddhartha's enlightenment, Bodh Gaya.

→ They were against the rigid Brahmanical rituals

↳ focus on enlightenment as a way to liberation

Relevent points and well explored examples

→ believed in minimalism / simple form of livings

Eg → The only pair of clothes Buddhist monks possessed was "geru vastra" (orange robe)

IMPACT ON INDIAN SOCIETY

Fair points Covered

- **Social Reform and Equality:**
[e.g.] Sangha, Bhikshu community.

→ Caste and community : Buddhism was open to everyone regardless of religion, race, caste, social status etc.

Eg → Angulimal (a fearsome criminal) was also welcomed by Buddha.

- **Women's Empowerment:**
[e.g.] Bhikkhuni Sangha, Mahaprajapati.

- **Art and Architecture:**
[e.g.] Sanchi, Ajanta, Bharhut.

→ Focus on spiritual upliftment rather than observance of complex rituals without jnana (knowledge)

- **Spread of Education and Morality:**
[e.g.] Nalanda, Vikramshila universities.

Can add on :
- *Ambedkar's Navayana Buddhism (1956)* promoted social justice and equality.

Conclusion is fine

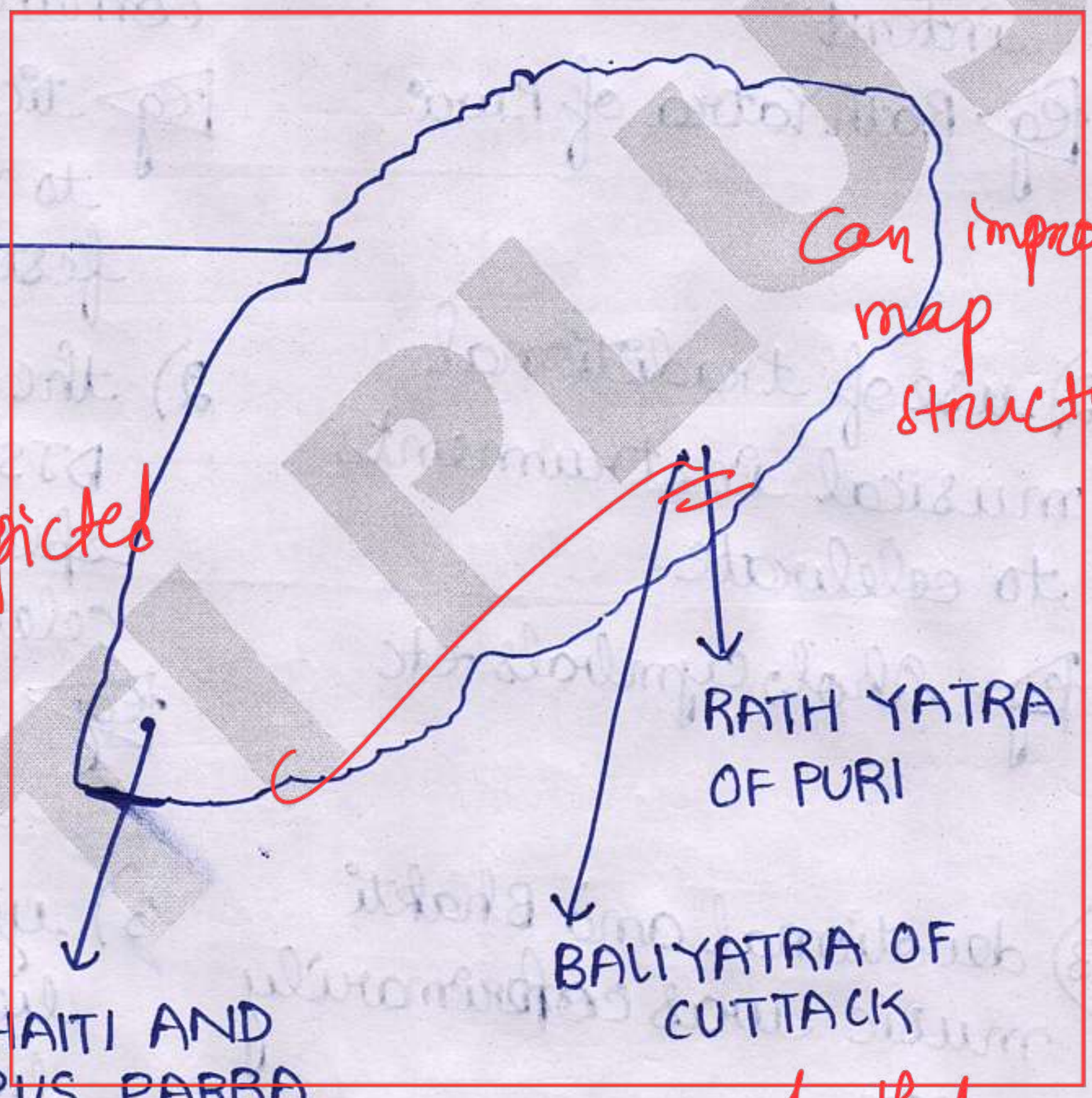
Buddhism not only impacted the spiritual life of people but also its tenents are showcased in art and architecture even today like in Dhauli Stupa (Odisha)

Buddhism was India's first moral revolution.
— Jawaharlal Nehru

6

Q5. Festivals in Odisha stand testimony to its spiritual, cultural and historical legacy that plays an indispensible role revamping the cultural tapestry of the state.

Fair Introduction



Well depicted map

Can improve map structure

good that you have label the place name too.

Regional festivals celebrated in various parts of Odisha

Due to globalization and increase in migration, the nature of festivals in Odisha has undergone a paradigm shift.

NATURE OF FESTIVALS IN OLDEN TIMES

1) purely based on religious & devotional intend
eg Rath Yatra of Puri

2) use of traditional musical instruments to celebrate.
eg Dhol, cymbals etc

3) devotional and Bhakti music was coprimarily seen.

4) festivals were seen as an occassion of togetherness

5) minimalism was followed during celebrations

NATURE OF FESTIVALS NOW :

1) an amalgamation of religion with commercialization
eg ticketing systems to visit during festive rush

2) the use of DJs & electronic speakers in celebrations.
eg guitars, brass bands.

3) practices being replaced by fast paced songs.

4) celebrating festivals in seclusion has become more common

5) increase in craze of costly, eye-catching decorations.

Traditional Nature of Odisha's Festivals
- Rooted in Agrarian Life:
[e.g.] Nuakhai, Raja Parba.
- Community and Spiritual Bonding:
[e.g.] Rath Yatra, Dola Purnima.
- Local Art and Folk Expressions:
[e.g.] Pala, Daskathia, Gotipua.

Changing Nature
- Commercialization of Rituals:
[e.g.] Rath Yatra telecasts, festival branding.
- Media and Digital Influence:
[e.g.] Live-streamed Puja, online Sand Art.
- Urbanization and Lifestyle Shifts:
[e.g.] Dandiya Nights, Christmas/New Year fests.
- Hybridization of Culture:
[e.g.] Western music in Pujas, LED decoration

Fair points
Covered aptly articulated through tabular manner

With an increase in globalization, the religious conciousness is under threat which should be prevented by adopting an assimilative and approach in order to protect our 'Odia Asmita'.

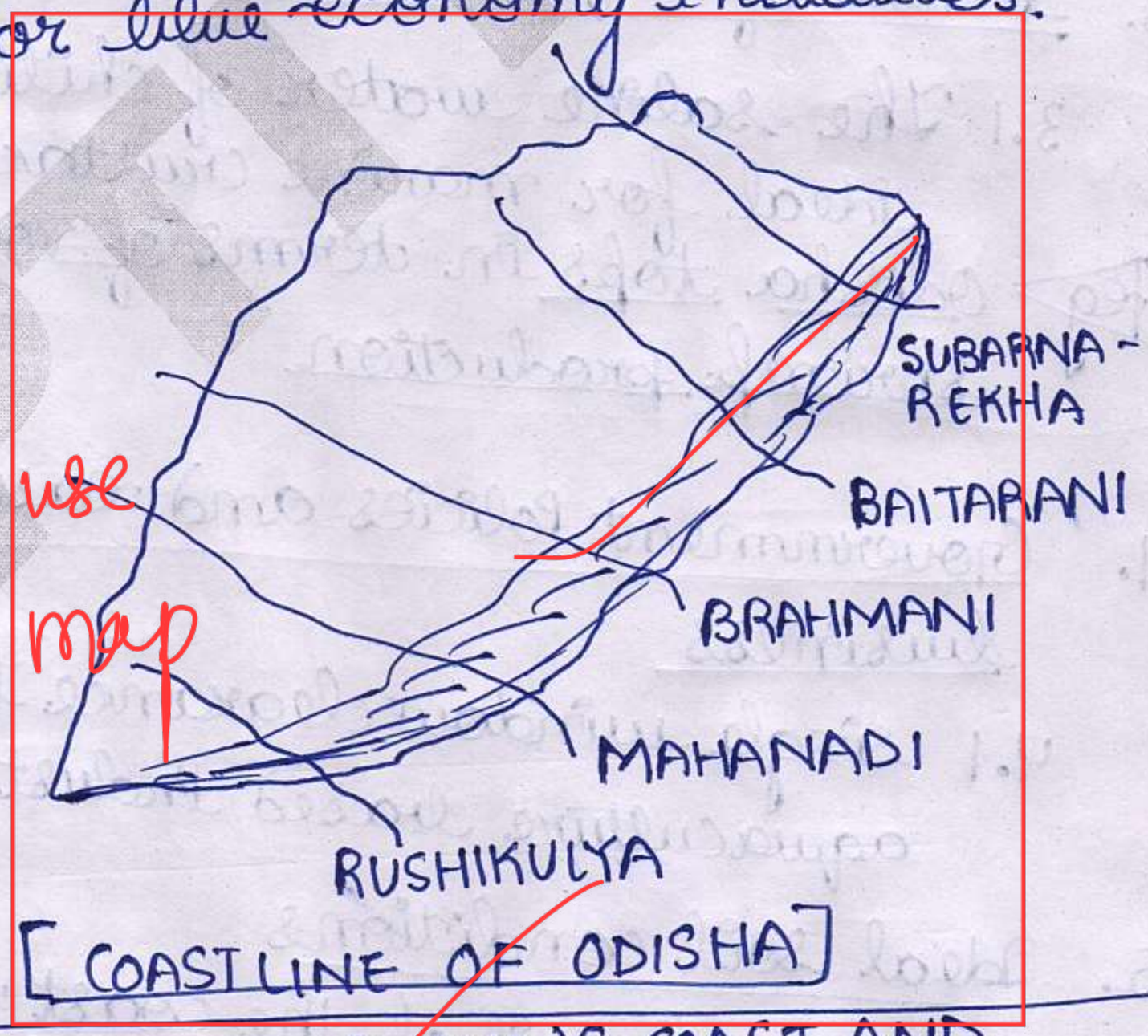
Can include
- Ekamra Heritage Project integrates urban heritage with temple festivities.

Conclusion is fine

5.25

Q6. Odisha has been blessed with a large coastline of around 480Km along with an intricate network of river channels principally Rushikulya, Mahanadi, Brahmani, Baitarani etc. that make it highly feasible for blue economy initiatives.

Valid Introduction



[COASTLINE OF ODISHA]

Good use of map

FACTORS THAT MAKE ODISHA'S COAST AND MARINE PHYSIOGRAPHY IDEAL FOR BLUE ECONOMY INITIATIVES

1. Presence of minor and major ports.
   1.1. improve inland and overseas
- Extensive Coastline:
  connectivity
[e.g.] Chilika, Gopalpur, Paradip

Eg Paradip has emerged as the largest cargo handling port of India.

- Rich Marine Biodiversity:
[e.g.] Bhitarkanika, Rushikulya rookery.

2. Strategic location of Odisha coast
   2.1 close proximity to Indonesian Islands
- Fertile Estuarine Systems:
[e.g.] Kendrapara, Jagatsinghpur.
   2.2. easy access the important Malacca strait.

- Navigable Ports and Harbours:
3. A hub of aquaculture sector
[e.g.] Paradip Port, Dhamra Port.
   3.1 The saline water of chilika is ideal for marine crustaceans

- Renewable Ocean Energy Prospects:
Eg Odisha topped in terms of volume of shrimp production
[e.g.] Gopalpur Bay, Chandbali coast.

4. Government policies and ease of doing business
   4.1 single window clearance for key aquaculture based industries

- Scope for Blue Economy Initiatives
- Sustainable Fisheries & Aquaculture:
[e.g.] Shrimp farming, fish processing hubs.
- Marine Tourism & Heritage Circuits:
[e.g.] Eco-tourism in Chilika, marine trails in Puri.
- Port-led Industrial Development:
[e.g.] Paradip Petroleum Hub, Dhamra SEZ.

5. Ideal soil conditions
   5.1 alluvial soil of the coast make large-scale paddy cultivation possible.

It becomes highly imperative to recognize such potentials and effectively work to enhance them as we move towards

— Former Chief Minister Naveen Patnaik

Odisha's blue wealth must grow without turning grey.

These points were valid and addressing the core demands

good use of sub points

Conclusion needs improvement

our goal of becoming 1.5$ trillion economy by 2047 in lieu of Viksit Odisha 2047 vision.

4.5 Relevant Introduction

Q7. Recently, the Indus Water Treaty has been put under lens when India suspended it in lieu of passive coercive measures against Pakistan in lieu of April 22 Pdhalgam attack

INDUS WATER TREATY

→ signed in 1960 between India & Pakistan mediated by World Bank

- Partition of Rivers:
  [e.g.] Ravi, Beas (India); Indus, Jhelum (Pakistan).

→ according to it, the eastern tributaries of Indus (Ravi, Beas and Sutlej) belonged to India and the western rivers (Indus, Jhelum, Chenab) belonged to Pakistan

- Water Usage Rights:
  [e.g.] Hydroelectric power, irrigation canals.

Fair use of flow chart example?

- Permanent Indus Commission:
  [e.g.] Regular meetings, data exchange.

→ it also made a provision for inter conflict resolution system.

- Dispute Resolution Mechanisms:
  [e.g.] Neutral expert, World Bank involvement.

GEOPOLITICAL IMPLICATION

→ India had got a minor share of rivers while the tributaries

allotted to Pakistan constituted 80:1. This puts India at a disadvantage.

- Foundation for Cooperation:

[e.g.] 1960 signing, 2003 Kabul meeting.

→ Though sharing of water of west for drinking and irrigation purposes is allowed, its use has been restricted by Pakistan.

Good point

- Source of Indo-Pak Tensions:

[e.g.] Hydroelectric projects, Pakistan objections.

→ Unregulated infra-development along the coast has affected the coastal ecosystem badly.

- Strategic Leverage:

[e.g.] Pakistan's fears of 'Indian water weapon'.

WAYS TO RESOLVE THE DISPUTES

→ Debate and discussion

→ employing a neutral mediator
  Eg → World Bank.

well articulated flowchart

→ Regular grievance redressal meetings

→ Strict observance of the clauses of the treaty.

Can explore:
- Treaty governs about **80%** **of Indo-Pak water flow.**
- *Permanent Indus Commission* formed in 1960 as per treaty.

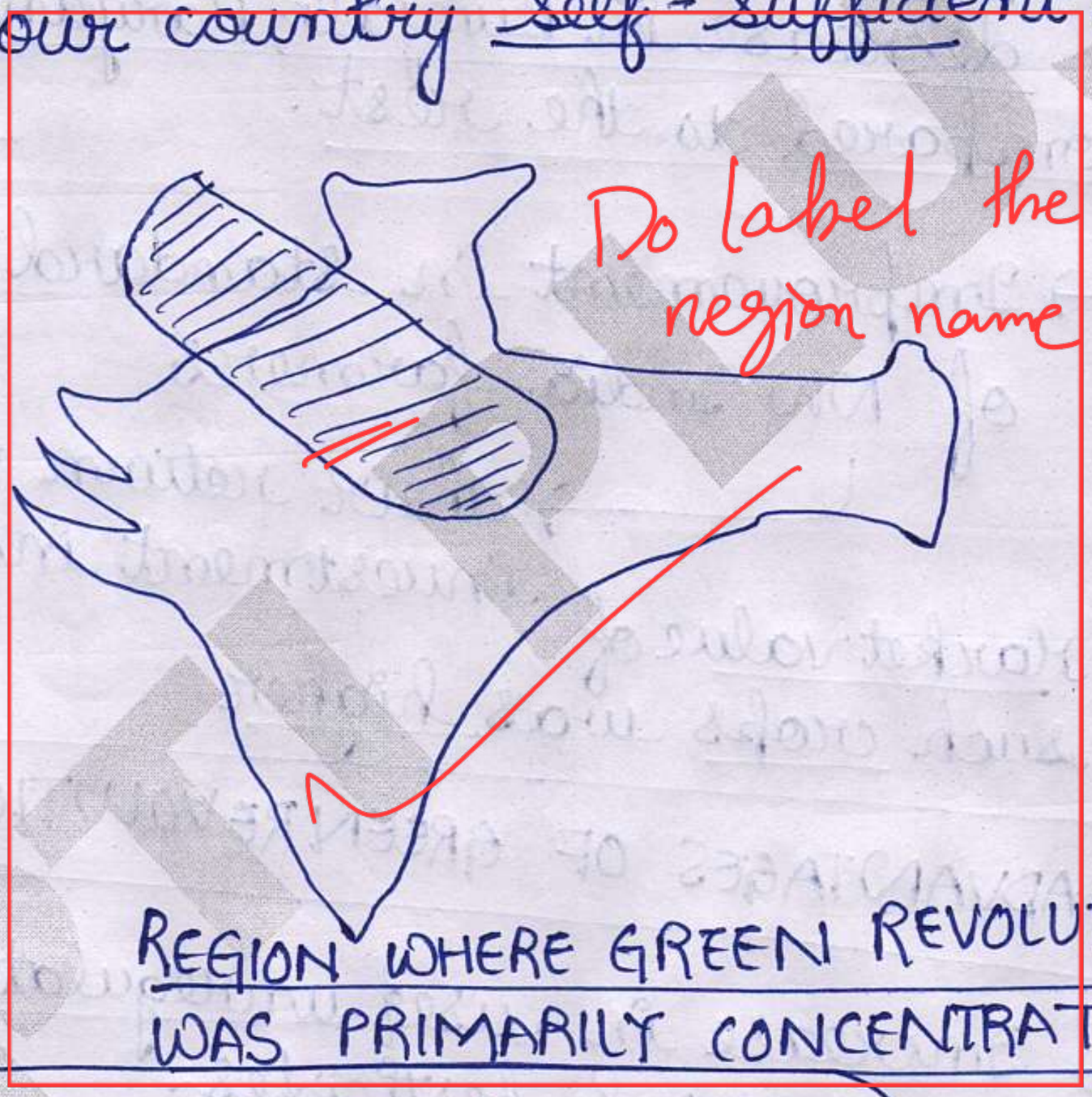
Water as a natural resource holds an indispensible role in the life of people transnationally, so it becomes imperative to prevent instances of weaponization of water.

Conclusion is Contextual

5

Fair scholar based Introduction

Q8- Green Revolution, a concept popularized by 'Norman Borlaug' worldwide and by M.S. Swaminathan in India during 1960s had played an indispensible role in making our country self-sufficient in food



REGION WHERE GREEN REVOLUTION WAS PRIMARILY CONCENTRATED.

ADVANTAGES OF GREEN REVOLUTION

→ Increase in yield and productivity of crops.

→ Introduction of high-yielding varieties of seed

Eg HYV of rice like Swarna and wheat like Lerma Rajo

- Increased Organic Matter:
[e.g.] Wheat, Paddy straw.

→ Use of fertilizers, insecticides and besticides (pesticides) made the crop-fields pest- and insect- ~~Pesticidence~~ Pesticidence

Eg → The cases of crop loss due to locusts decrease in Punjab, Haryana as compared to the rest.

- Enhanced Soil Fertility Management:
[e.g.] NPK fertilizers, micronutrients.

- Improved Soil Conservation Awareness:
[e.g.] Punjab, Haryana farms.

→ Improvement in standard of living of NW India farmers → their return on investment increased.

You have good hold on Content as well explored too-

→ Increase in market value of such crops was higher.

DISADVANTAGES OF GREEN REVOLUTION

→ Increase in use of unregulated insecticides & pesticides

- Soil Nutrient Depletion:
[e.g.] Nitrogen saturation, declining phosphorus.

→ decrease in overall soil health

→ leaching into the groundwater and runoff to rivers leading to Eutrophication

- Soil Salinization & Alkalinity:
[e.g.] Western UP, Punjab plains.

→ Skewed distribution of benefits

Eg → The farmers of Punjab, Haryana are highly rich as compared to others.

- Loss of Soil Microbial Diversity:
[e.g.] Reduced nitrogen-fixing bacteria.

It becomes imperative to adopt proper cropland field assessment in order to gauge the right requirements of crops and improve the overall health of crop field.

Can include:
- National Commission on Farmers (2004) recommended integrated nutrient management.
- Soil Health Card Scheme (2015) promotes balanced fertilization.

Conclusion can be better

3.75

Q. Mangroves are specialized forests that are adapted to survive in saline and inter-tidal waterlogged conditions. They play an indispensible role in mitigating the impacts of climate change in coastal ecosystem.

Intro can be better

(i) Improvement in the microclimate
→ increase the amount of available moisture.
- **Carbon Sequestration:**
[e.g.] Sundarbans, Bhitarkanika.

(ii) Regulation of Hydrological cycle
→ help to balance out the erratic spells of rainfall.
- **Coastal Protection:**
[e.g.] Cyclone shelters, tidal buffer zones.

(iii) Filtration of air
→ sps such as Avicennia and Sonneratia filter out toxic pollutants from air
- **Biodiversity Support:**
[e.g.] Fish nurseries, migratory birds.

→ regulates the cloud formation
- **Water Filtration:**
[e.g.] Nutrient cycling, sediment trapping.

Relevent points but do strengthen it through example

iv) Flood mitigation
↳ the roots bind the water molecules in soil, regulating the flow of excessive water.

write neatly

- **Blue Carbon Ecosystem:**

[e.g.] Soil carbon pools, biomass carbon.

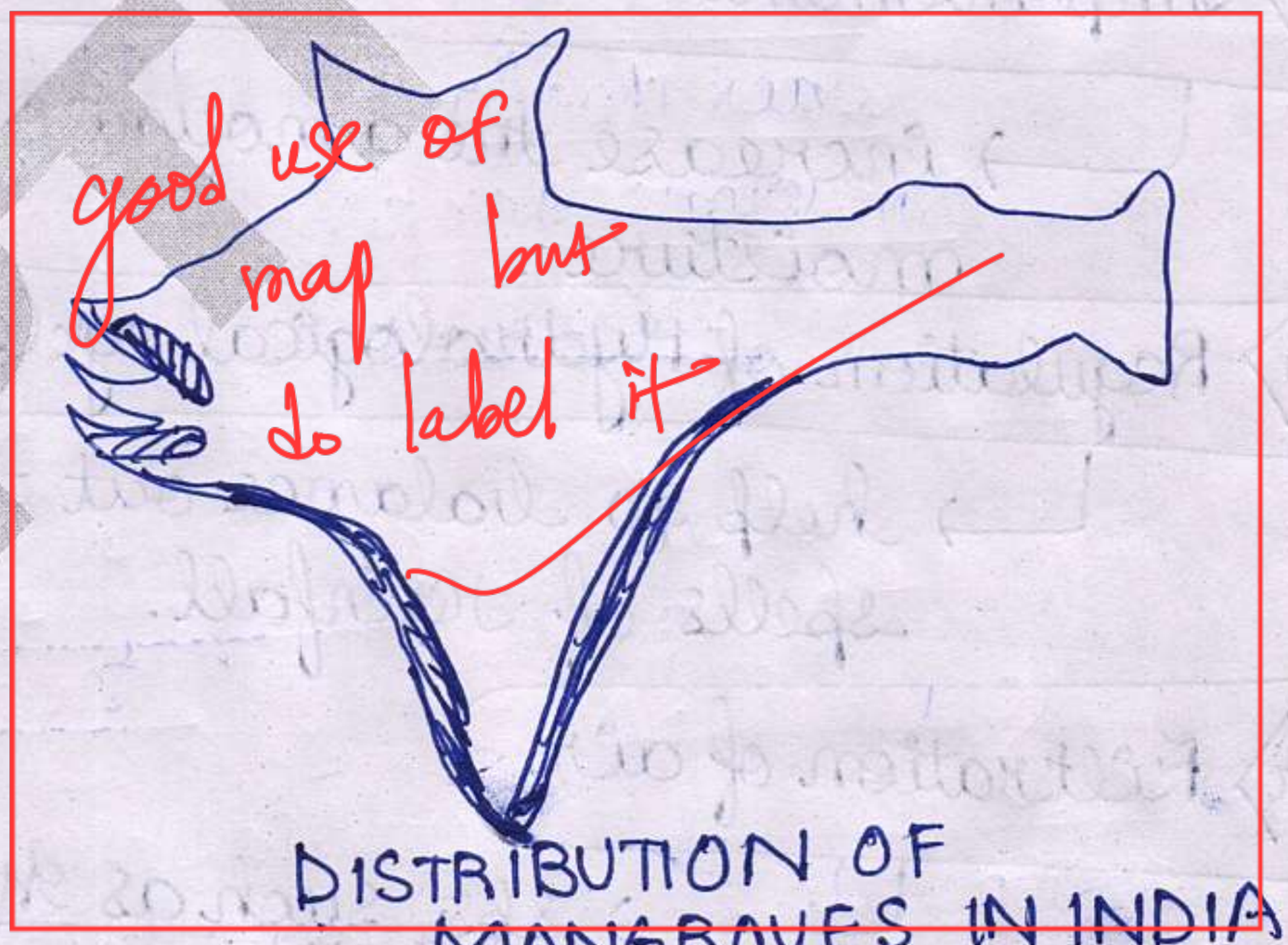
- **Storm Surge and Flood Mitigation:**

[e.g.] Odisha cyclone defense, Andhra coast protection.

v) Protection as coastal ecosystem
↳ act as a natural barrier against storm surges and inundation during heavy rainfall.

- **Adaptation to Sea Level Rise:**

[e.g.] Sediment trapping, root expansion.



DISTRIBUTION OF MANGROVES IN INDIA

Considering the indispensible ecological role mangroves have to play, it becomes imperative to pay more attention towards their rejuvination through schemes such as MISTI Scheme, strict implementation of CRZ rules etc.

Good use of Govt. initiative

Can add on :

- *National Mangrove Committee* under Ministry of Environment, Forests and Climate Change (MoEF&C).

4.5

Q12/ Urbanization refers to the movement of people from rural to urban areas in search of employment, education, good standard of living etc. Presently, India stands only next to China in terms of urban population, which has become a double sided sword for India.

Apt Introduction

OPPORTUNITIES OF URBANIZATION OF INDIA

→ Increase in urban workforce
  → availability of cheap labour is a boon for industries.

→ Better opportunities for people example?
- **Economic Growth:**
[e.g.] IT hubs, manufacturing zones.
- **Employment Generation:**
[e.g.] Services sector, startups.
- **Improved Infrastructure:**
[e.g.] Metro rail, hospitals.
- **Cultural Exchange:**
[e.g.] Festivals, art galleries.

  → better connectivity
  → integration into the banking system
  → better availability of jobs
  → more educational opportunities for children.

→ Less caste-based discrimination of low caste people
↳ common among rural household.

SIGNIFICANT CHALLENGES OF URBANIZATION

- **Infrastructure Deficits:**
[e.g.] Slums, traffic congestion.
- **Environmental Degradation:**
[e.g.] Air pollution, urban heat islands.
- **Social Inequality:**
[e.g.] Informal settlements, migrant workers.
- **Governance Issues:**
[e.g.] Coordination failures, inadequate policies.

Proliferation of urban slums
↓ due to paucity of land and high cost of housing
↓ Eg: Dharavi in Maharashtra

proliferation of vector borne diseases due to unhygenic living.
Very well articulated points

increase in dropout rates among migrant children
↓ due to high cost of schooling

Increase in disguised unemployment
↓ due to less availability of jobs and increase in demand for skilled labour

alienation from the local urban folk.

Do address the trend limit

It becomes imperative to take effective and efficient steps to prevent our urban population from becoming a demographic burden

Can be better

Can include:
- National Urban Transport Policy (2014) aims to improve urban mobility.
- Smart Cities Mission fosters tech driven urban development.

7.5

915. Odia language holds an indispensible place in the social, cultural and religious ~~place in the~~ history of Odisha. Granted the status of classical language in 2014, it is the pride of our 'Odia Asmita'.

Good Start

Write neatly

ANCIENT TIMES (upto 10th C CE)

→ originated from Magadhi Prakrit and Abrabhamsa dialects.

- Origin in Odra Prakrit:
[e.g.] Ashokan inscriptions, Buddhist texts.

→ seen in Sanskrit inscriptions, stone carving etc.

- Early Epigraphic Evidence:
[e.g.] Udaipur copper plates, Kalinga inscriptions.

MEDIEVAL TIMES (10th C - 18th C CE)

→ heralded as an era of renaissance in Odia literature, particularly under the reign of Gajapati rulers like Purusottamadeva, Prataprudradeva etc.

- Influence of Sanskrit:
[e.g.] Religious texts, court literature.

You have good hold on Content but do Support it with examples

, popularized by writers such as:-

- Jagannath Das - wrote 'Odia Bhagabat'
- Jasobanta Das
- Balaram Das
- Achutyananda Das
- Sishu Ananta Das
- Sarala Das - wrote 'Odia Mahabharata', 'Vilankar Ramayana'

- Development of Script:
[e.g.] Rounded letter forms, palm-leaf manuscripts.

- Medieval Literary Growth:
[e.g.] Mahabharata translation, Bhakti poetry.

Try to explone numerical points rather than Symbols

→ composition of Saraswati Vilasam, law book by Prataprudra Deva
→ composition of Jayadeva (Gita Govinda)
→ revolutionary Odia writings of Panchasakhas
→ hymns composed by Salabega

MODERN PERIOD (19th C – present)

→ Advent of Printing Press in Odisha
→ 1st (1837) @ Cuttack
→ 2ND (1866) @ Cuttack by Gouri Shankar Roy
→ 3RD (1868) @ Balasore by Fakir Mohan Senapati

Avoid this

- **Colonial Era Printing:**
[e.g.] First Odia newspaper, Purnachandra Odia Bhashakosha.
- **Standardization of Language:**
[e.g.] Odisha Sahitya Akademi, language committees.
- **Influence of English and Hindi:**
[e.g.] Education, administration.
- **Modern Literary Renaissance:**
[e.g.] Fakir Mohan Senapati, Gopabandhu Das.

→ other compositions:
→ Utkal Dipika (Gouri Shankar)
→ Samaja (Gopabandhu Das)
→ Sambalpur Hitasini
→ Prajatantra
→ newspapers like
– Dainik Asha (1928)
– Kunjabara Patrika (1837)

Fair points but do briefly explone it.

— Satyabadi Banabidyalaya set up by Gopabandhu Das (1909) played an indispensible role in spread of literature in Odia language.

Can include:
- Odia recognized as a Classical Language of India in 2014.
- Classical Language Committee (MoE) recommended Odia's status.

It has now become imperative to protect and guard our linguistic heritage in the wake of rising threat from globalization and westernization.

6.75

Q14. Odisha boasts a coastline of 480 Km, dissected by several rivers such as Rushikulya, Mahanadi, Brahmani, Baitarani etc. But it is a dismal state of affairs to see the threat it faces from increase in sand mining and industrial effluents.

Valid

Introduction

IMPACT OF SAND MINING

→ Adverse impact on aquatic biodiversity → essential for aquatic food chain

- Riverbed Degradation:

[e.g.] Mahanadi, Brahmani rivers.

→ Increase in soil erosion / land degradation in nearby coast

example?

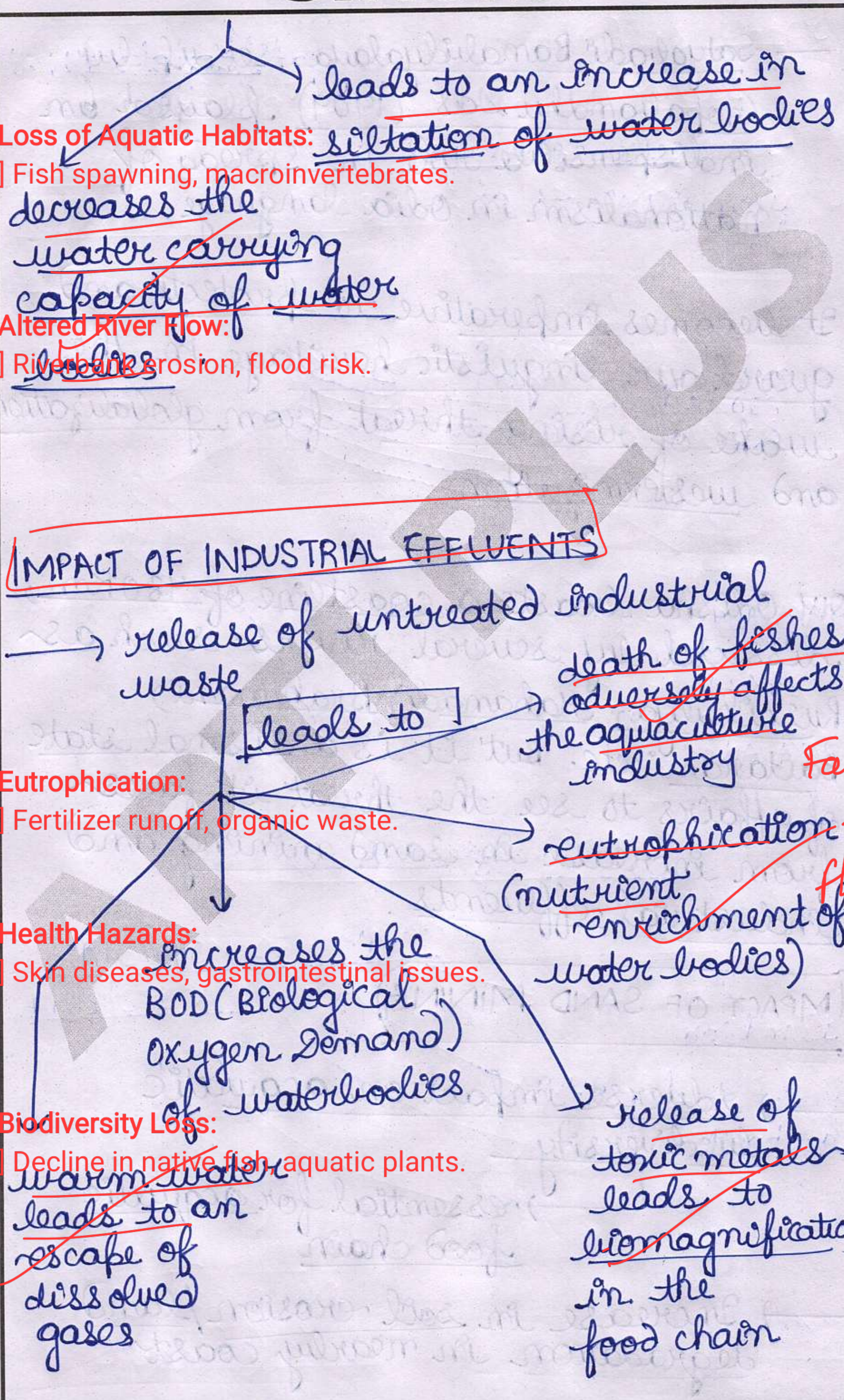
- **Loss of Aquatic Habitats:**
[e.g.] Fish spawning, macroinvertebrates.

- **Altered River Flow:**
[e.g.] Riverbank erosion, flood risk.

- **Eutrophication:**
[e.g.] Fertilizer runoff, organic waste.

- **Health Hazards:**
[e.g.] Skin diseases, gastrointestinal issues.

- **Biodiversity Loss:**
[e.g.] Decline in native fish, aquatic plants.



regular monitoring of CPCBs & SPCBs

adoption of a "zero waste" policy by industries

Relevent points but do explore each points briefly

National Ganga Action Plan

WAY FORWARD FOR THE ABOVE PROBLEMS.

Can include:
- Odisha's rivers suffer from **30-40% pollution load due to industries** (CPCB report).

construction of Effluent Treatment Plants (ETPs) near the coast

- *Odisha State Pollution Control Board (OSPCB) regulates effluent discharge.*

strict implementation of Coastal Regulation Zone rules.

Sustainable management of sand resources is essential for ecological balance.

Conclusion is fine

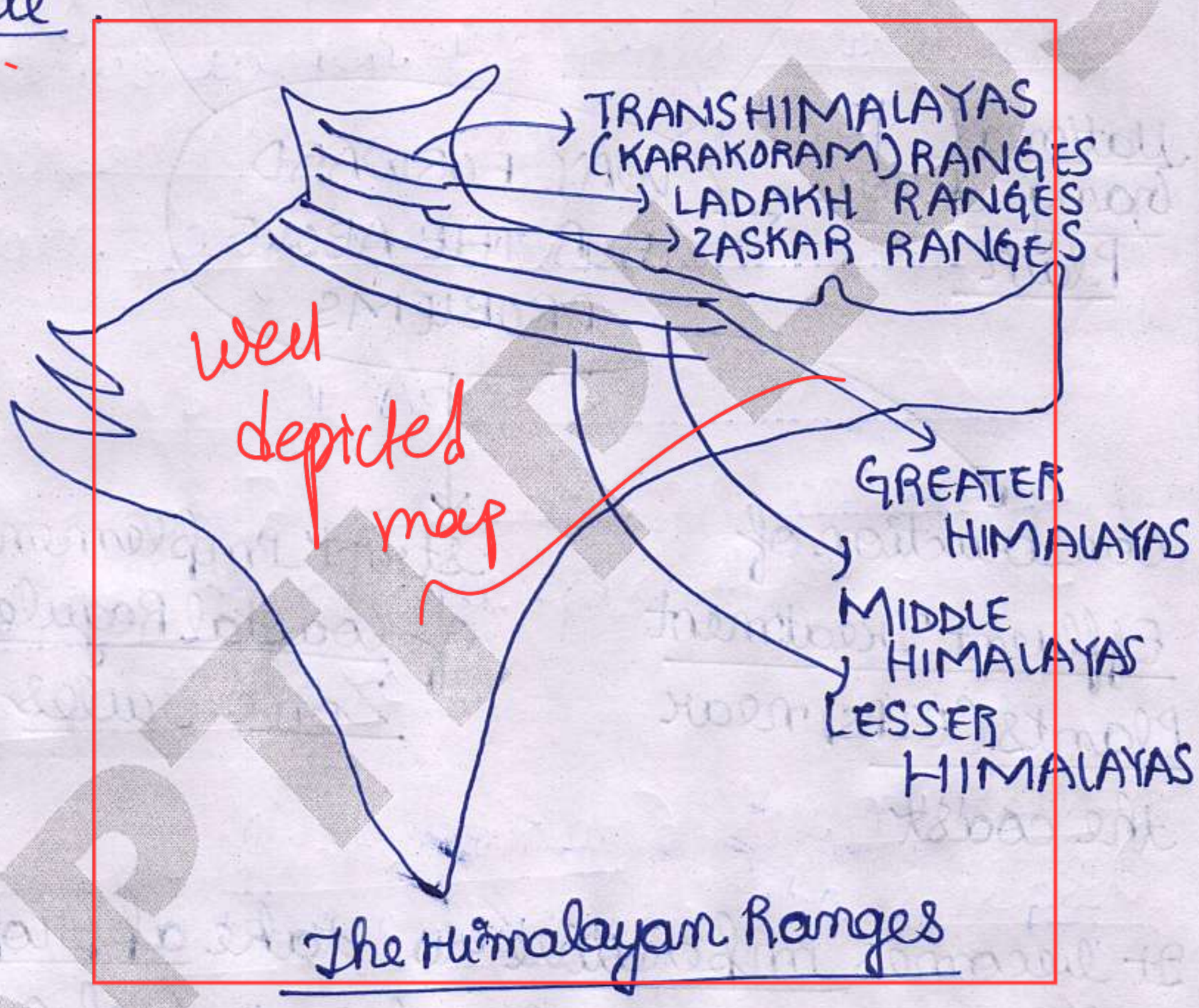
It becomes imperative to take appropriate steps to augment the potential of Odisha's coastal and Blue Economy initiatives and emerge as a leader to boost the 'Viksit Odisha 2047' vision.

NITI Aayog Report

6

Fair Introduction

Q13. Himalayas popularly termed as 'Water Tower of Asia' hold high ecological value. But their topography, soil and climatic conditions make it extremely fragile

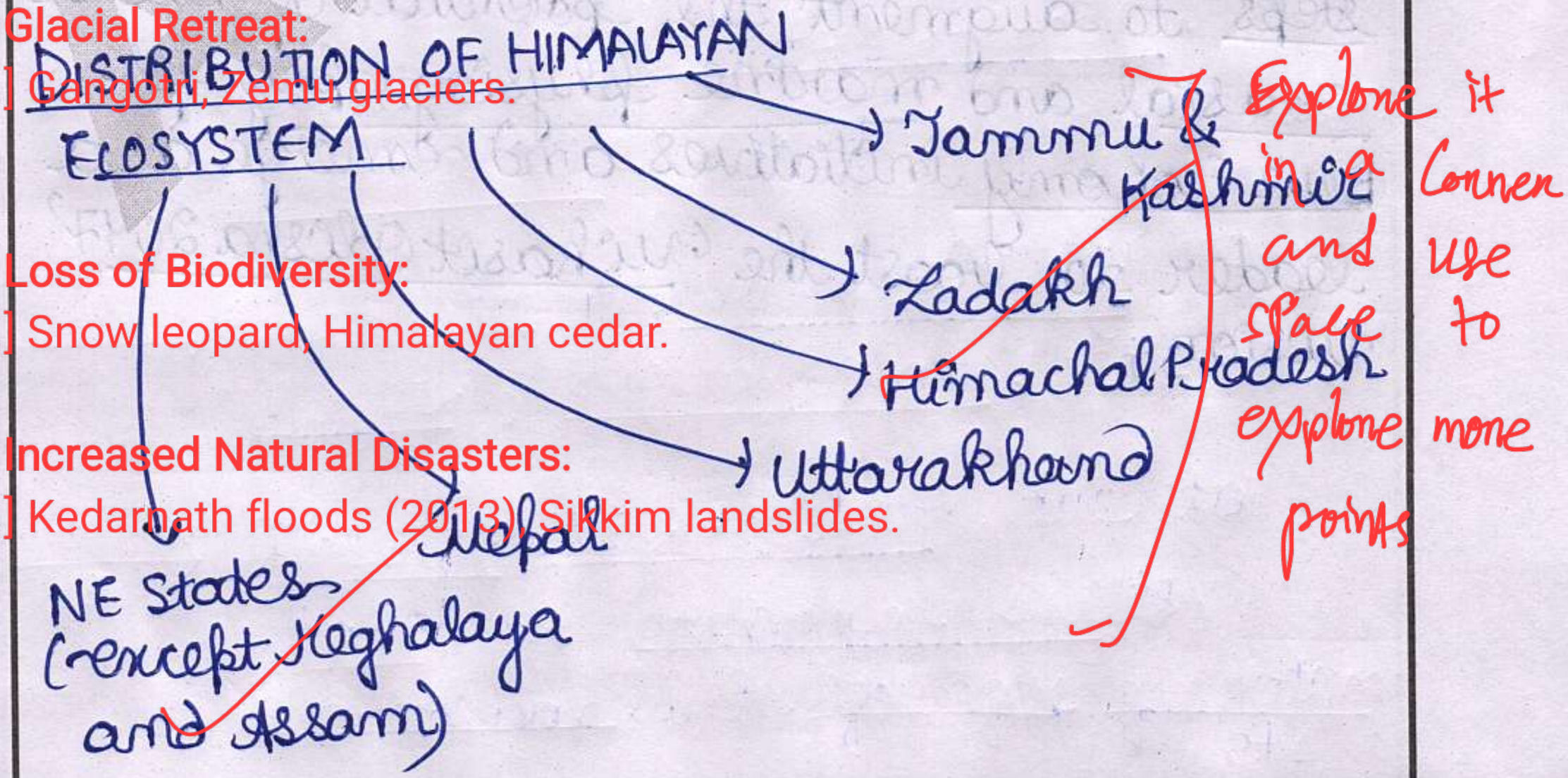


The Himalayan Ranges

- **Glacial Retreat:**
[e.g.] Gangotri, Zemu glaciers.

- **Loss of Biodiversity:**
[e.g.] Snow leopard, Himalayan cedar.

- **Increased Natural Disasters:**
[e.g.] Kedarnath floods (2013), Sikkim landslides.



REASONS FOR INCREASED VULNERABILITY OF HIMALAYAN ECOSYSTEM

→ Increase in unconsolidated sediments at foothills due to concentration of major rivers
eg Ganga-Brahmaputra basin

→ The continuous movement of Indian plate towards Eurasian plate makes it earthquake prone.
eg The do

→ unregulated tourism and rise of urbanization in eco-sensitive areas
eg leads to land subsistence cases as seen in Joshimath

→ Presence of tectonically active hotspots leads to occurences of natural disasters
eg earthquakes, landslides etc

It becomes imperative to protect this ecosystem given its high ecological value through sector specific initiatives such as National Action

good points

Threat to Livelihoods:
[e.g.] Terrace farming, yak herding.

Water Security Risks:
[e.g.] Irrigation, drinking water supply.

Infrastructure Vulnerability:
[e.g.] Hydel dams, mountain roads.

Climate-induced Migration:
[e.g.] Rural to urban migration.

Write neatly

Can include:
- Himalayan glaciers losing 0.5 meters of ice thickness annually (Wadia Institute).
- *Indian Himalayan Climate Adaptation Programme (IHCAP) focuses on resilience.*

The Himalayas are the water towers of Asia – UNEP

Conclusion is fine

Plans alongwith spread of awareness and community engagement.

4

Well Intro good

10. The rank of India in suitability for ageing population is 123rd out of 143 countries which in itself underscores the unreadiness of our countries to sustain large ageing population.

written and use of data

CHALLENGES OF AGEING POPULATION

Box your heading to highlight

→ Increased pressure on medical sector to make provisions for geriatric care.

- **Healthcare Burden:**

[e.g.] Diabetes, hypertension.

→ The high demand for nursing workers superceeds the supply.

- **Economic Dependency:**

[e.g.] Pension schemes, family support.

→ Increase in out-of-pocket expenditure of younger generation.

- **Social Isolation:**

[e.g.] Depression, elder abuse.

→ Increase in vulnerability to thefts, digital scams etc.

- **Inadequate Infrastructure:**

[e.g.] Geriatric wards, assisted living.

→ Loss of self-esteem due to lack of technical skills, digital gap with younger generations etc

These points were valid and addressing the core demand

PM Jan Dhan Yojana — to integrate them into Banking sector

PM Vayoshree Yojana

GOVERNMENT INITIATIVES FOR AGEING POPULATION

- **National Policy on Older Persons (1999):**
  [e.g.] Pension schemes, old age homes.
- **Maintenance and Welfare of Parents and Senior Citizens Act (2007):**
  [e.g.] Family maintenance, legal redressal.
- **Healthcare Initiatives:**
  [e.g.] NCD clinics, health insurance.
- **Social Security Schemes:**
  [e.g.] Monthly pensions, financial aid.

Regional Health Ayushman Bharat Jan-Arogya Yojana — ₹5 lakh per year to cover secondary and tertiary medical expenses

PM Vaya-Vandana Yojana

Well depicted govt. schemes

Do explore how does it help ageing populations

Relevant Conclusion

It becomes imperative to adopt suitable measures in order to harvest the skills of senior-citizens and prevent them from becoming a demographic burden

ALL ODISHA OPSC OCS MAINS TEST SERIES 2024 TEST ID -01

(GS Paper I: Heritage and Culture, Geography of India with Special Reference to Odisha)

Total Marks : 250 Time : 3 Hours

The Question Paper contains 17 questions.
In Group- A, 12 (Twelve) and Group-B, 5(Five) together.
ପ୍ରଶ୍ନପତ୍ରରେ ୧୭ଟି ପ୍ରଶ୍ନ ଅଛି।
Group- A, ୧୨ (ବାର) ଏବଂ Group-B, ୫ (ପାଞ୍ଚ) ଟି ପ୍ରଶ୍ନ ରହିଛି ।

Question 1 to Question 12
15 marks each (answer in 250 words)

Question 13 to Question 17
20 marks each (answer in 300 words)

GROUP A

Q.1 **Analyze the evolution of temple architecture in India, highlighting the key differences between the Nagara and Dravida styles.**
ଭାରତର ମନ୍ଦିର ସ୍ଥାପତ୍ୟକଳାର ବିକାଶକୁ ବିଶ୍ଳେଷଣ କର, ଏବଂ ନାଗର ଓ ଦ୍ରାବିଡ ଶୈଳୀମାନଙ୍କ ମଧ୍ୟରେ ଥିବା ପ୍ରମୁଖ ତଫାତକୁ ଉଲ୍ଲେଖ କର।

Q.2 **Discuss the role of the Bhakti movement in the development of regional music and devotional singing traditions across India.**
ଭାରତର ବିଭିନ୍ନ ଅଞ୍ଚଳର ସଙ୍ଗୀତ ଓ ଭଜନ ଐତିହ୍ୟର ବିକାଶରେ ଭକ୍ତି ଆନ୍ଦୋଳନର ଭୂମିକାକୁ ଆଲୋଚନା କର।

Q.3 **Highlight the role of the Bengal School of Art in the nationalist movement and its contribution to the development of a modern Indian artistic identity.**
ଜାତୀୟତାବାଦୀ ଆନ୍ଦୋଳନରେ ବେଙ୍ଗଲ୍ ସ୍କୁଲ୍ ଅଫ୍ ଆର୍ଟ୍ (Bengal School of Art) ର ଭୂମିକା ଏବଂ ଏହା ଦ୍ୱାରା ଆଧୁନିକ ଭାରତୀୟ କଳା ସ୍ୱତନ୍ତ୍ରତାର ଉନ୍ନୟନରେ ହୋଇଥିବା ଅବଦାନକୁ ଆଲୋକପାତ କର ।

Q.4 **Critically analyze the core tenets of Buddhist philosophy and its impact on Indian society.**
ବୌଦ୍ଧ ଦାର୍ଶନିକତାର ମୂଳ ନୀତିଗୁଡିକୁ ସମାଲୋଚନାତ୍ମକ ଭାବରେ ବିଶ୍ଳେଷଣ କର ଏବଂ ଏହାର ଭାରତୀୟ ସମାଜ ଉପରେ ପ୍ରଭାବକୁ ଆଲୋଚନା କର।

Q5. **Critically examine the changing nature of festivals in Odisha in the wake of modernization and globalization.**
ଆଧୁନିକୀକରଣ ଏବଂ ବିଶ୍ୱୀକରଣର ପରିପ୍ରେକ୍ଷିତରେ ଓଡ଼ିଶାର ପର୍ବପର୍ବାଣୀମାନଙ୍କର ପରିବର୍ତ୍ତିତ ସ୍ୱରୂପକୁ ସମାଲୋଚନାତ୍ମକ ଭାବରେ ପରୀକ୍ଷା କର।

Q6. **Evaluate the potential of Odisha's coastal and marine physiography for Blue Economy initiatives.**
ନୀଳ ଅର୍ଥନୀତି ପଦକ୍ଷେପ ପାଇଁ ଓଡ଼ିଶାର ଉପକୂଳ ଏବଂ ସାମୁଦ୍ରିକ ଭୌଗୋଳିକ ସ୍ଥିତିର ସମ୍ଭାବନା ମୂଲ୍ୟାଙ୍କନ କରନ୍ତୁ।

Q7. **"The Indus Water Treaty has been a subject of both cooperation and conflict between India and Pakistan." Analyze the provisions of the treaty and its geopolitical implications.**
"ସିନ୍ଧୁ ଜଳ ଚୁକ୍ତିନାମା ଭାରତ ଏବଂ ପାକିସ୍ତାନ ମଧ୍ୟରେ ସହଯୋଗ ଏବଂ ବିବାଦ ଉଭୟର ବିଷୟ ହୋଇଆସିଛି।" ଚୁକ୍ତିନାମାର ବ୍ୟବସ୍ଥା ଏବଂ ଏହାର ଭୂରାଜନୈତିକ ପ୍ରଭାବ ବିଶ୍ଳେଷଣ କରନ୍ତୁ।

Q8. **Critically evaluate the impact of the Green Revolution on the soil health of India.**
ଗ୍ରୀନ୍ ରେଭଲୁସନ୍ (Green Revolution) ର ଭାରତର ମାଟିର ସ୍ୱାସ୍ଥ୍ୟ ଉପରେ ହୋଇଥିବା ପ୍ରଭାବକୁ ସମାଲୋଚନାତ୍ମକ ଭାବରେ ମୂଲ୍ୟାୟନ କର।

Q9. **Discuss the role of mangroves in mitigating the impacts of climate change.**
ପରିବେଶୀୟ ପରିବର୍ତ୍ତନ (climate change) ର ପ୍ରଭାବକୁ କମାଇବାରେ ମ୍ୟାଙ୍ଗ୍ରୋଭ୍ (mangroves) ଗଛମାନଙ୍କର ଭୂମିକାକୁ ଆଲୋଚନା କର।

Q10. **Critically evaluate the challenges and policy responses related to the aging population in India.**
ଭାରତର ବୃଦ୍ଧ ଲୋକସଂଖ୍ୟା (aging population) ସମ୍ବନ୍ଧୀୟ ଚ୍ୟାଲେଞ୍ଜ ଏବଂ ନୀତିଗତ ପ୍ରତିକ୍ରିୟାମାନଙ୍କୁ ସମାଲୋଚନାତ୍ମକ ଭାବରେ ମୂଲ୍ୟାୟନ କର।

Q11. **Analyze the socio-religious significance of temples in the life of the people of Odisha.**
ଓଡ଼ିଶାର ଲୋକମାନଙ୍କ ଜୀବନରେ ମନ୍ଦିରମାନଙ୍କର ସାମାଜିକ–ଧାର୍ମିକ ଗୁରୁତ୍ୱକୁ ବିଶ୍ଳେଷଣ କର।

Q12. **The process of urbanization in India is characterized by both opportunities and significant challenges. Critically Evaluate.**
ଭାରତର ନଗରୀକରଣ (urbanization) ପ୍ରକ୍ରିୟାରେ ଥିବା ସୁଯୋଗ ଏବଂ ଗୁରୁତ୍ୱପୂର୍ଣ୍ଣ ଚ୍ୟାଲେଞ୍ଜମାନଙ୍କୁ ସମାଲୋଚନାତ୍ମକ ଭାବରେ ମୂଲ୍ୟାୟନ କର।

GROUP- B

Q13. **The Himalayan ecosystem is vulnerable to the impacts of climate change. Examine.**
ପରିବର୍ତ୍ତନର ପ୍ରଭାବ ପ୍ରତି ହିମାଳୟ ଇକୋସିଷ୍ଟମ ଦୁର୍ବଳ। ପରୀକ୍ଷା କରନ୍ତୁ।

Q14. **Evaluate the impact of sand mining and industrial effluents on the health of Odisha's rivers.**
ବାଲି ଖଣି ଏବଂ ଶିଳ୍ପ ନିର୍ଗତ ଜଳର ଓଡ଼ିଶାର ନଦୀଗୁଡ଼ିକର ସ୍ୱାସ୍ଥ୍ୟ ଉପରେ ପ୍ରଭାବ ମୂଲ୍ୟାଙ୍କନ କରନ୍ତୁ।

Q15. **Trace the evolution of the Odia language from its ancient roots to its modern form.**
ଓଡ଼ିଆ ଭାଷାର ବିକାଶକୁ ଏହାର ପୁରାତନ ମୂଳରୁ ଆଧୁନିକ ରୂପ ପର୍ଯ୍ୟନ୍ତ ଅନୁସୂଚୀତ କର।

Q16. **Recently, several Himalayan states have experienced cloudburst-induced flash floods. How do cloudbursts differ from normal rainfall events, and why are the Himalayas particularly vulnerable?**
ସାମ୍ପ୍ରତିକ ଭାବରେ କିଛି ହିମାଳୟ ରାଜ୍ୟରେ ମେଘବର୍ଷା-ପ୍ରେରିତ ତୁରନ୍ତ ବନ୍ୟା (cloudburst-induced flash floods) ଘଟିଛି। ସାଧାରଣ ବର୍ଷା ସହ ମେଘବର୍ଷାର ପରିବର୍ତ୍ତନକୁ କିପରି ପରିଭାଷିତ କରାଯାଏ, ଏବଂ ହିମାଳୟ କାହିଁକି ବିଶେଷଭାବେ ସମ୍ବେଦନଶୀଳ?

Q17. **The coastal plains of Odisha are a region of dynamic geographical processes and high vulnerability to natural hazards. Comment.**
ଓଡ଼ିଶାର ଉପକୂଳବର୍ତ୍ତୀ ସମତଳ ଅଞ୍ଚଳଗୁଡ଼ିକ ଗତିଶୀଳ ଭୌଗୋଳିକ ପ୍ରକ୍ରିୟା ଏବଂ ପ୍ରାକୃତିକ ବିପଦ ପ୍ରତି ଉଚ୍ଚ ବିପଦପୂର୍ଣ୍ଣ ଅଞ୍ଚଳ। ଏହା ବିଷୟରେ ମତାମତ ଦିଅ।

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DETAILED EXPLANATION

GS PAPER I: HERITAGE AND CULTURE, GEOGRAPHY OF INDIA WITH SPECIAL REFERENCE TO ODISHA

ALL ODISHA OPSC OCS MAINS TEST SERIES PROGRAM 2024

Test ID
1

Group A

Q1. Answer

Approach

- Provide a brief introduction to the origins of Indian temple architecture.
- Trace the evolution of temple architecture through key historical periods.
- Detail the distinct characteristics of the Nagara and Dravida styles.
- Present a comparative analysis to highlight the key differences between the two styles.
- Conclude with a summary of their significance in India's cultural heritage.

Introduction

The tradition of temple architecture in India has a rich and diverse history, evolving over centuries and reflecting the country's cultural and religious heritage. The genesis of structural temples can be traced back to the Gupta period, around the 5th century CE, moving from earlier traditions of rock-cut caves and shrines. Over time, two predominant styles of temple architecture emerged, shaped by regional, cultural, and dynastic influences: the Nagara style in the north and the Dravida style in the south.

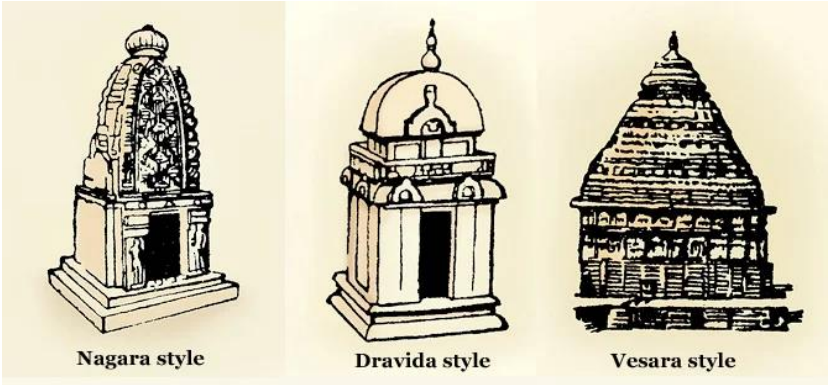
Body

Evolution of Temple Architecture in India

The development of temple architecture can be broadly categorized into the following stages:

- **Early Beginnings (Gupta Period):** The Gupta era marked the beginning of free-standing structural temples, which were relatively simple in design. These early temples featured a square sanctum sanctorum (garbhagriha) and a small pillared porch (mandapa). Initially, they were flat-roofed, but later developments saw the emergence of a curvilinear tower or *shikhara*.

- **Post-Gupta Developments:** Following the Guptas, regional dynasties began to develop their own distinct architectural idioms. This period saw experimentation with the form and structure of the shikhara and an increase in sculptural ornamentation.
- **Medieval Period:** This era witnessed the crystallization of the major temple styles. The Nagara style flourished in Northern India under dynasties like the Chandelas, while the Dravida style reached its zenith in the South under the patronage of the Pallavas, Cholas, Pandyas, and later the Vijayanagara rulers. A third style, the Vesara, emerged in the Deccan region, combining elements of both Nagara and Dravida traditions.



Nagara Style of Temple Architecture

Prevalent in North India, the Nagara style is characterized by its distinctive beehive-shaped, curvilinear tower (*shikhara*). Key features of this style include:

- **Platform:** The entire temple is built on a high stone platform with steps leading up to it.
- **Shikhara:** The most prominent feature is the *shikhara*, which is a tall, curving spire that crowns the *garbhagriha*. The shikhara is topped by a crowning element known as an *amalaka* (a fluted disc) and a *kalasha* (a finial).
- **Garbhagriha:** The sanctum sanctorum is always located directly beneath the tallest shikhara.
- **Mandapas:** The shikhara is accompanied by one or more pillared halls called *mandapas*, which are arranged on the same axis as the *garbhagriha*.
- **Absence of Boundary Walls:** Nagara temples generally do not have elaborate boundary walls or gateways (*gopurams*), which is a key differentiator from the Dravida style.
- **Sub-styles:** The Nagara style has several sub-styles based on the form of the shikhara, such as the Latina, Shekhari, and Bhumija. Notable examples include the Kandariya Mahadeva Temple in Khajuraho and the Sun Temple in Konark.

Dravida Style of Temple Architecture

The Dravida style of temple architecture is prominent in Southern India and is distinguished by its pyramidal towers. Its primary features are:

- **Enclosure:** The temple complex is enclosed within a compound wall.
- **Gopuram:** The entrance to the temple complex is marked by a massive gateway tower known as a *gopuram*, which is more ornate and towering than the main temple vimana.
- **Vimana:** The main temple tower is called a *vimana*. Unlike the curving *shikhara* of the Nagara style, the *vimana* is a stepped pyramid that rises up geometrically. The crowning element of the *vimana* is also referred to as the *shikhara*, which is octagonal in shape.
- **Mandapas:** Like Nagara temples, Dravida temples also feature pillared halls.
- **Temple Tank:** A large water reservoir, or temple tank, is a common feature found within the temple complex.
- **Sculptures:** The entrances are flanked by fierce *dwarapalas* (doorkeepers), and the temple walls are adorned with intricate sculptures.
- **Panchayatan Style:** Many Dravidian temples follow the *panchayatan* layout, with a principal shrine and four subsidiary shrines at the corners. Prime examples of the Dravida style include the Brihadeeswarar Temple in Thanjavur and the Shore Temple at Mahabalipuram.

Conclusion

The Nagara and Dravida styles of temple architecture reflect the diverse cultural and geographical landscape of India. While the Nagara style emphasizes soaring verticality with its curvilinear shikharas, the Dravida style focuses on the horizontal expanse and grandeur of its enclosed complexes with towering gopurams. Together, they form a crucial part of India's architectural and cultural legacy.

Q2. Answer

Approach

- Give a brief introduction about the Bhakti movement.
- Explain the role of the Bhakti movement in promoting regional music and devotional singing.
- Provide examples of saints and the musical traditions they influenced across different regions.
- Conclude by summarizing the movement's lasting impact on India's cultural and musical heritage.

Introduction

The Bhakti movement, a religious and social reform movement in medieval India, revolutionized spirituality by emphasizing personal devotion and love for God as the primary means of salvation. A key element of this movement was the use of regional languages and music to make religious teachings accessible to the common people, leading to a flourishing of diverse devotional singing traditions across the subcontinent.

Body

Bhakti movement Role in Developing Regional Music and Devotional Singing:

- **Use of Vernacular Languages:** Bhakti saints composed their hymns and songs in local languages like Braj Bhasha, Awadhi, Bengali, Marathi, and Tamil, rather than the traditional Sanskrit. This linguistic shift was crucial in connecting with the masses and led to the development of rich vernacular literature and devotional music.
- **Democratization of Worship:** By prioritizing devotion over complex rituals, the movement empowered people from all strata of society, including women and lower castes, to express their spirituality through music. This inclusivity promoted a participatory musical culture.
- **Emergence of New Musical Forms:** The Bhakti saints were not just poets but also accomplished musicians who created and popularized new forms of devotional music. These included:
- **Bhajans and Kirtans:** These congregational singing traditions, characterized by call-and-response chanting, became central to Bhakti worship.
- **Abhangas:** In Maharashtra, saints like Tukaram and Namdev composed devotional poetry in the form of *abhangas*, which are still sung today.
- **Shabad:** In Punjab, the teachings of Guru Nanak and other Sikh Gurus were compiled in the form of *shabads* or hymns, which form the basis of Sikh devotional music (Kirtan).
- **Pada, Doha, and Chhand:** Bhakti poets adopted these lyrical forms, which influenced the development of classical genres like Dhrupad and Vishnupad.

Regional Contributions of Bhakti Saints:

Different regions of India saw the rise of distinct devotional music traditions spearheaded by influential saints:

- **South India:** The movement's origins can be traced to the Alvars (devotees of Vishnu) and Nayanars (devotees of Shiva) in the Tamil-speaking regions. Their hymns, compiled in the *Divya Prabandham* and *Tirumurai* respectively, laid the foundation for Carnatic music. Purandara Dasa is revered as the "Pitamaha" (father) of Carnatic music for his immense contributions.
- **North India:** Saints like Surdas, Mirabai, and Tulsidas composed devotional songs in Braj Bhasha and Awadhi, centered on Krishna and Rama. Their compositions are integral to the Hindustani classical and semi-classical music traditions. Kabir's Dohas, expressing a syncretic philosophy, became a significant part of the folk and devotional music of this region.
- **Eastern India:** In Bengal, Chaitanya Mahaprabhu popularized the practice of *sankirtana*, or congregational chanting and dancing in praise of Krishna. This led to the development of the Padavali Kirtan tradition. In Assam, Sankaradeva used music and drama (Bhaona) to spread Vaishnavism.
- **Western India:** In Gujarat, Narsinh Mehta's bhajans, particularly "Vaishnav Jan To," became deeply ingrained in the regional culture. In Rajasthan, Mirabai's bhajans dedicated to Krishna are a cherished part of the devotional music landscape.

Conclusion

The Bhakti movement democratized spirituality by using vernacular languages and music, challenging rigid hierarchies. Its saints nurtured inclusivity, devotion, and artistic expression, laying a cultural foundation that shaped India's diverse regional and classical musical traditions.

Q3. Answer

Approach

- Provide a brief introduction to the Bengal School of Art and its origins within the nationalist context.
- Examine its specific role and contributions to the Swadeshi and nationalist movements.
- Discuss how it helped forge a modern Indian artistic identity by rejecting Western styles and reviving indigenous traditions.
- Conclude by summarizing its lasting impact on Indian art.

Introduction

The Bengal School of Art emerged in the early 20th century in British India, in Calcutta and Santiniketan, as a direct response to the prevailing Western academic art styles promoted by the colonial rulers. Led by pioneers like Abanindranath Tagore and E.B. Havell, it became an artistic arm of the broader nationalist movement, aiming to establish a distinct Indian identity in the realm of art.

Body

Role in the Nationalist Movement:

- **Cultural Swadeshi and Rejection of Western Art:** The Bengal School was a form of cultural rebellion. It rejected the materialism and academic realism of Western art, which was seen as a tool of cultural colonization. Artists were encouraged to boycott British art schools and their conventions, aligning with the Swadeshi movement's call for self-reliance.
- **Revival of Indian Themes and Aesthetics:** The school drew inspiration from India's rich artistic heritage, including Mughal and Pahari miniature paintings, as well as the murals of Ajanta and Ellora. Artists chose themes from Indian mythology, classical literature, and rural life, promoting a sense of national pride and cultural consciousness. Abanindranath Tagore's iconic painting, *Bharat Mata* (1905), depicted a saffron-clad woman as a divine mother figure for the nation, becoming a powerful symbol of Indian nationalism.
- **Promotion by Nationalists:** The movement received support from nationalist leaders and intellectuals like Sister Nivedita and Ananda Coomaraswamy. They championed the Bengal School as the foundation for a national art, believing that political independence would be incomplete without cultural and artistic freedom.

Contribution to Modern Indian Artistic Identity:

- **Forging a New Visual Language:** The Bengal School is credited with creating a new Indian style of painting. A key innovation was the "wash" technique, adapted from Japanese artists, which created a soft, mystical, and ethereal quality in the paintings, contrasting with the bold oil paintings of the West. This technique helped to convey a sense of spirituality and introspection that was considered uniquely Indian.
- **Influence on Later Generations:** It successfully broke the dominance of Western academic art and inspired subsequent generations of artists, such as Nandalal Bose, Asit Kumar Haldar, and Jamini Roy, to explore their Indian roots while experimenting with modern forms. Nandalal Bose, for example, was later commissioned by Mahatma Gandhi to create posters for the Haripura session of the Indian National Congress in 1938.
- **Institutionalization of Indian Art Education:** Under Abanindranath Tagore's leadership at the Government College of Art & Craft in Calcutta, and later at Kala Bhavana in Santiniketan, the curriculum was revised to focus on Indian traditions and techniques, nurturing a new generation of artists grounded in a national aesthetic.

Conclusion

The Bengal School of Art was far more than an artistic style; it was a cultural renaissance that played a pivotal role in the nationalist movement. By rejecting colonial artistic norms and reviving indigenous traditions, it not only contributed to the struggle for independence but also successfully developed a modern Indian artistic identity that continues to influence artists today.

Q4. Answer

Approach

- Give a brief introduction to Buddhist philosophy.
- Explain the core tenets of Buddhism, such as the Four Noble Truths and the Eightfold Path.
- Analyze the multifaceted impact of these tenets on Indian society, covering social, cultural, and ethical dimensions.
- Conclude by summarizing its enduring legacy despite its decline in India.

Introduction

Buddhist philosophy originated in the 6th century BCE, presents a rational and pragmatic path to end human suffering. It is centered on the Middle Path, avoiding extremes of self-indulgence and severe asceticism, which was a significant departure from other contemporary religious practices.

Body

Core Tenets of Buddhist Philosophy:

The foundation of Buddhist thought rests on the **Four Noble Truths**:

1. There is suffering in life (*Dukkha*).
2. Suffering has a cause, which is craving and attachment (*Samudāya*).
3. It is possible to end suffering (*Nirodha*).
4. The way to end suffering is by following the **Noble Eightfold Path** (*Magga*).

The Eightfold Path is a practical guideline grouped into wisdom (*prajñā*), ethical conduct (*śīla*), and mental discipline (*samādhi*). Central to this philosophy is the rejection of a permanent self or soul (*Anatta*) and the acceptance of impermanence (*Anicca*). By challenging the authority of the Vedas and rejecting the caste system, Buddhism presented a radical departure from the prevailing Brahmanical orthodoxy.

Impact on Indian Society:

- **Social Reform:** By rejecting the caste system and promoting egalitarian values, Buddhism appealed to marginalized sections of society, including women and Shudras. It promoted a sense of social equality and challenged hereditary privileges.
- **Promotion of Non-Violence (Ahimsa):** The strong emphasis on non-violence and compassion for all living beings became a cornerstone of Indian ethics, influencing social and political thought for centuries.
- **Art and Architecture:** Buddhism inspired a rich tradition of art and architecture, including the construction of stupas (Sanchi), viharas (monasteries), and magnificent rock-cut caves (Ajanta and Ellora), which are a vital part of cultural heritage.
- **Education and Literature:** Monasteries like Nalanda and Vikramshila evolved into great international centers of learning. The use of vernacular languages like Pali for scriptures made profound philosophical ideas accessible to the common people.

Despite its initial success, Buddhism's influence as a major religion declined significantly by the 12th century. This was due to several factors, including a loss of royal patronage after the Pala empires, the resurgence of reformed Hinduism which assimilated key Buddhist principles like *ahimsa*, and the destruction of monasteries during Turkic invasions.

Conclusion

While Buddhism as an organized religion largely vanished from India, its core tenets left an indelible mark on Indian civilization. Its contributions to ethics, art, philosophy, and social reform were absorbed into the fabric of Indian culture, and its message of compassion, non-violence, and rational inquiry continues to resonate.

Q5. Answer

Approach

- Give a brief introduction about the cultural significance of festivals in Odisha.
- Discuss the positive changes brought by modernization and globalization.
- Highlight the negative impacts and challenges.
- Conclude with a balanced perspective.

Introduction

Festivals are an integral part of Odisha's rich cultural society, deeply interwoven with its ancient traditions, agricultural cycles, and spiritual ethos. From the grand spectacle of the Rath Yatra to the agrarian celebration of Nuakhai, these festivals have historically reinforced community bonds and preserved cultural identity. However, the forces of modernization and globalization have altered the very nature and expression of these age-old festivities.

Positive Impacts of Modernization and Globalization:

- **Global Recognition and Tourism:** Globalization has pushed festivals like the Puri Rath Yatra onto the world stage, attracting international tourists and media, which boosts the local economy and promotes cultural diplomacy. Live telecasts and social media campaigns allow the global Odia diaspora to connect with their roots.
- **Technological Integration:** Modern technology has enhanced the festive experience. Cuttack's Durga Puja is famed for its innovative themes and dazzling light displays. Digital platforms and e-commerce have also created wider markets for artisans whose crafts are integral to festivals.
- **Economic Opportunities:** The scale of festivals has grown, leading to a surge in economic activity. This has created a structured ecosystem for event management, sponsorships, and marketing, turning events like the Rath Yatra into significant economic drivers.

Negative Impacts and Challenges:

- **Commercialization and Loss of Authenticity:** There is a growing trend towards commercialization, where the spiritual and community essence of festivals is overshadowed by corporate sponsorships and consumerism. This dilutes the core values of festivals, shifting focus from participation to spectacle.
- **Environmental Degradation:** Modern practices have introduced environmental concerns. The use of non-biodegradable materials like plaster of Paris and chemical paints for idols leads to water pollution during immersion rituals. Increased use of plastics and heightened noise pollution are other concerning issues.
- **Cultural Homogenization:** Globalization poses a threat of cultural homogenization, where unique local and tribal festive traditions are marginalized in favor of more mainstream, pan-Indian celebration styles. The organic, community-led nature of festivals like Raja Parba is sometimes lost in urban, event-managed celebrations.

Conclusion

The impact of modernization and globalization on Odisha's festivals is a double-edged sword. While these

forces have amplified their reach and created new economic opportunities, they also threaten their authenticity and environmental sustainability. The future lies in striking a conscious balance: leveraging modernity to enhance celebrations while preserving the core rituals, community spirit, and ecological harmony that have defined these traditions for centuries.

Q6. Answer

Approach

- Define the Blue Economy and link it to Odisha's unique coastal physiography
- Evaluate the potential across key areas. Discuss the critical challenges that must be addressed to realize this potential sustainably.
- Summarize the opportunity and restate that a balanced, sustainable approach is the only way forward.

Introduction

The "Blue Economy" is a sustainable development framework that uses ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of the ocean ecosystem. For Odisha, a state endowed with 480-kilometer coastline and a diverse marine physiography, the Blue Economy is not just a concept but a significant opportunity to drive its next wave of progress.

Body

Evaluating the Potential of Odisha's Coastal Physiography

Strategic Coastline for Maritime Trade and Logistics: Odisha's long and relatively straight coastline is a natural asset for maritime trade.

- **Paradip Port**, one of India's major deep-water ports, and other fast-growing ports like **Dhamra and Gopalpur**. These serve as crucial gateways for the mineral-rich hinterland.
- Under the **Sagarmala Programme**, potential to develop the ports into hubs of port-led industrialization, creating jobs in logistics, warehousing, and manufacturing. The development of coastal shipping routes can further reduce logistics costs for domestic trade.

Rich Continental Shelf and Deltas for Fisheries and Aquaculture: The confluence of major rivers like the Mahanadi, Brahmani, and Baitarani creates nutrient-rich deltas and a productive continental shelf.

- This physiography makes Odisha one of India's leading states in marine fish production. Its seafood exports, particularly frozen shrimp, are a major source of foreign exchange.
- Scope to expand sustainable aquaculture, especially brackish water farming of shrimp and crabs, which can significantly boost the income of coastal communities.

Unique Coastal Ecosystems for Eco-Tourism

- Asia's largest brackish water lagoon, Chilika is a biodiversity hotspot. Its population of **Irrawaddy dolphins**, rich birdlife, and thriving brackish water fisheries make it a prime location for sustainable eco-tourism and aquaculture.
- Home to the world's largest congregation of saltwater crocodiles, the Bhitarkanika mangrove forest is a vital ecosystem. It acts as a natural buffer against cyclones, serves as a massive carbon sink, and offers unique opportunities for conservation-focused tourism.
- The beaches at **Gahirmatha Marine Sanctuary** and the **Rushikulya river mouth** are the world's largest nesting sites for the endangered Olive Ridley sea turtles. This natural site has huge potential for developing a globally recognized eco-tourism circuit focused on conservation.

Untapped Mineral and Energy Resources

- **Beach Sand Minerals:** Odisha's beaches are rich in placer minerals, including ilmenite, zircon, and sillimanite, which are vital for various industries. Sustainable mining of these "Beach Sand Minerals" can be a significant economic contributor.
- **Offshore Wind Energy:** With a long coastline and consistent wind patterns, Odisha has high potential for developing offshore wind energy projects. As India targets **500 GW of renewable energy by 2030**, tapping into this offshore potential can make Odisha a key player in the country's green energy transition.

To unlock this potential, Odisha must navigate several critical challenges:

- **Extreme Climate Vulnerability:** As a state in a cyclone-prone zone, Odisha's coastal infrastructure and communities are highly vulnerable to the impacts of climate change, including rising sea levels and an increase in the frequency and intensity of storms.
- **Industrial and Urban Pollution:** Effluents from industries in the port hinterlands and plastic pollution pose threat to marine ecosystems, particularly sensitive areas like Chilika and Bhitarkanika.
- **Resource Conflicts:** There is a potential for conflict between the needs of industrial development (ports, mining) and the rights of traditional communities, especially fishermen.

The way forward lies in adopting an Integrated Coastal Zone Management (ICZM) approach. This requires:

- **Investing in climate-resilient infrastructure** and natural coastal defenses like mangrove restoration.
- **Strictly enforcing pollution control norms** for all industries and urban centers.
- **Developing a policy framework for sustainable tourism** that empowers local communities and prioritizes conservation.
- **Conducting scientific mapping** of marine resources to ensure that their exploitation is sustainable.

Conclusion

Odisha's coastal and marine features offer immense potential in trade, fisheries, tourism, and energy. By pursuing sustainable, inclusive development that balances growth with ecological preservation, the state can build a thriving Blue Economy while safeguarding its natural heritage.

Q7. Answer

Approach

- Briefly introduce the Indus Water Treaty (IWT).
- Detail the key articles of the IWT.
- Examine how the treaty has promoted cooperation by surviving wars and providing a dispute resolution mechanism
- Discuss the treaty's role as a tool for diplomacy, its connection to the Kashmir issue, and the emerging challenges.
- Conclude by summarizing the need for adaptive diplomacy.

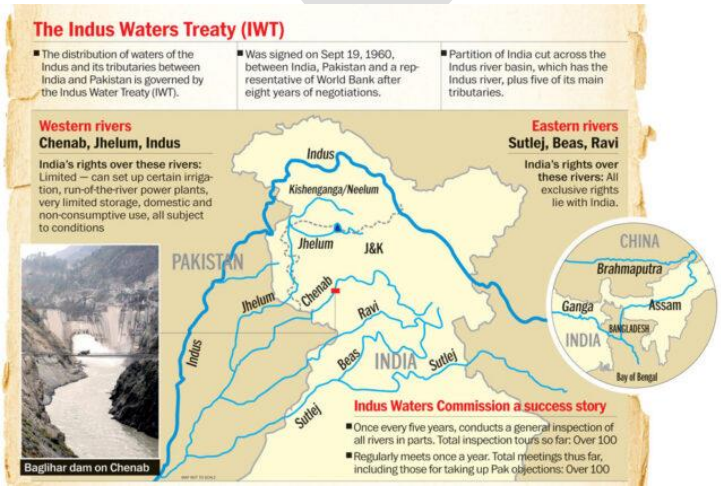
Introduction

The Indus Water Treaty (IWT) was signed in 1960 and brokered by the World Bank, governs the sharing of waters from the Indus river system between India and Pakistan. In April 2025, India temporarily suspended its participation in the Indus Water Treaty (IWT) in response to a cross-border terrorist attack. The treaty, originally a rare success in bilateral relations, is now under increased strain, with India citing the Vienna Convention on the Law of Treaties for potential future termination or suspension.

Body

Provisions of the Treaty

- **Division of Rivers:** The treaty allocates the three "Eastern Rivers"—the Beas, Ravi, and Sutlej—for India's unrestricted use. The three "Western Rivers"—the Indus, Jhelum, and Chenab—were allocated to Pakistan for unrestricted use.
- **India's Rights on Western Rivers:** While Pakistan has rights over the western rivers, the treaty allows India limited use of their waters for domestic purposes, agriculture, and the generation of run-of-the-river hydroelectric power, subject to specific design criteria.
- **Data Exchange and Cooperation:** The IWT established the Permanent Indus Commission (PIC), with a commissioner from each country. The commission is mandated to meet annually to exchange data, conduct inspections, and resolve potential disputes, thereby promoting cooperative arrangements for the treaty's implementation.
- **Dispute Resolution Mechanism:** The treaty provides a three-tiered mechanism for conflict resolution: questions are first addressed by the PIC, followed by a Neutral Expert (appointed by the World Bank), and finally, a Court of Arbitration.



A Subject of Cooperation and Conflict

An Enduring Symbol of Cooperation: The treaty has survived three wars and numerous military standoffs between India and Pakistan. The PIC has consistently met, demonstrating a sustained commitment to cooperation even during periods of high political tension. The successful resolution of disputes like the Salal Dam and Baglihar Dam projects, through bilateral negotiations or third-party mediation, highlights the treaty's functional success.

A Source of Lingering Conflict: Despite its successes, the treaty has been a recurring point of friction. Pakistan has frequently raised objections to Indian hydroelectric projects on the Western Rivers, such as the Kishenganga and Ratle projects. It argues that the design of these projects violates the treaty's technical specifications and gives India excessive control over water flows. These disputes have led to disagreements over the appropriate dispute resolution forum, with Pakistan preferring a Court of Arbitration and India advocating for a Neutral Expert, leading to procedural deadlocks.

The treaty's role extends beyond water management, carrying significant weight in the regional geopolitical landscape.

- **A Tool of Statecraft:** As the upper riparian state, India holds a natural advantage. In recent years, there have been calls within India to use the treaty as a strategic tool to pressure Pakistan over issues like cross-border terrorism, expressed by the sentiment that "blood and water cannot flow together." Following Pahalgam terrorist attacks, India suspended the IWT, signaling a shift from viewing it as a purely technical agreement to a matter of national security.
- **Link to the Kashmir Issue:** The sources of the Indus and its tributaries are geographically linked to the disputed territory of Kashmir, intertwining the water issue with this core political conflict.
- **Economic and Security Concerns for Pakistan:** Pakistan's agrarian economy is heavily dependent on the Indus river system, which provides about 80% of the water for its irrigated agriculture. Any disruption in water supply will result in a significant threat to its food security, economic stability, and national security.

- **Emerging Challenges:** The IWT was drafted in 1960 and does not account for contemporary challenges like climate change, which impacts glacial melt and river flows, or population growth and environmental concerns. India has formally sought a "review and modification" of the treaty, citing these changed circumstances.

Conclusion
The Indus Water Treaty represents a paradox—an instrument of peace that prevents water wars, yet a fragile agreement strained by political mistrust and modern-day challenges. Both nations must engage in dialogue and update the treaty to address contemporary issues like climate change and establish more transparent data-sharing mechanisms.

Q8. Answer

Approach
- Give a brief introduction about the Green Revolution and its objectives.
- Discuss the negative impacts of the Green Revolution on soil health.
- Briefly mention positive impacts to provide a balanced view.
- Conclude with a way forward, suggesting sustainable agricultural practices.

Introduction
The Green Revolution was initiated in the 1960s, was an agricultural strategy aimed at achieving food self-sufficiency for India. It successfully boosted food grain production, particularly wheat and rice, by introducing High-Yielding Variety (HYV) seeds, modern irrigation techniques, and intensive use of chemical fertilizers and pesticides. While it prevented famine and ensured food security, this intensive agricultural model has had deep and lasting consequences on the soil health.

Body
Negative Impacts on Soil Health:
- **Nutrient Imbalance and Depletion:** The Green Revolution promoted the use of synthetic fertilizers, primarily nitrogen (N), phosphorus (P), and potassium (K). This uneven application led to an over-reliance on primary nutrients while neglecting essential micronutrients like zinc, iron, copper, and manganese. Over time, this has resulted in micronutrient deficiencies in soils, reducing their fertility and impacting crop productivity.
- **Increased Soil Toxicity:** The intensive and indiscriminate use of chemical pesticides, herbicides, and insecticides to protect HYV crops has led to the accumulation of toxic residues in the soil. These chemicals disrupt the soil's natural microbial activity, harm beneficial organisms like earthworms, and contaminate both soil and groundwater, resulting in long-term environmental and health risks.
- **Soil Salinity and Alkalinity:** The expansion of irrigation, a foundation of the Green Revolution, especially in arid and semi-arid regions like Punjab and Haryana, has caused significant soil degradation. Over-irrigation and poor drainage have led to waterlogging and capillary action, which brings mineral salts to the surface. This process results in increased soil salinity and alkalinity, resulting in vast tracts of agricultural land unfit for cultivation.
- **Decline in Soil Organic Carbon (SOC):** The practice of monocropping (cultivating rice and wheat in rotation) and the burning of crop residue, instead of integrating it back into the soil, have led to a severe decline in Soil Organic Carbon, which is vital for maintaining soil structure, water retention, and nutrient supply. Its depletion weakens the soil's natural fertility and resilience.
- **Soil Compaction and Erosion:** The increased mechanization, involving heavy machinery like tractors and harvesters, has led to the compaction of topsoil. Compacted soil has reduced porosity, which

hinders water infiltration and root penetration. This, combined with the loss of vegetative cover, makes the soil more susceptible to wind and water erosion.

Positive Impacts:
In regions with inherently deficient soils, the application of NPK fertilizers led to a rapid increase in fertility and crop yields, which was crucial for meeting immediate food demands. This demonstrated the potential of scientific inputs to enhance productivity in the short term.

Way Forward
The Green Revolution was instrumental in making India food-secure, but its success came at a significant ecological cost; degradation of soil health. The chemical-intensive and resource-exploitative model has proven unsustainable in the long run.
To reverse this damage and ensure future agricultural sustainability, a shift towards ecologically sound practices is imperative. The way forward lies in:

- **Integrated Nutrient Management (INM):** Combining the use of chemical fertilizers with organic sources like compost, farmyard manure, and green manure to restore soil nutrient balance.
- **Promoting Organic and Natural Farming:** Encouraging farming systems that rely on ecological processes, such as the Paramparagat Krishi Vikas Yojana (PKVY).
- **Conservation Agriculture:** Adopting practices like zero-tillage, crop rotation, and retaining crop residues to improve soil structure and organic matter.
- **Micro-irrigation:** Promoting the use of drip and sprinkler irrigation to improve water-use efficiency and prevent salinization.
- **Soil Health Card Scheme:** Ensuring effective implementation of the scheme to enable farmers to make informed decisions about nutrient application based on soil test results.

By integrating these sustainable practices, India can mitigate the adverse effects of the Green Revolution, rejuvenate its soil health, and move towards a more resilient and sustainable agricultural future.

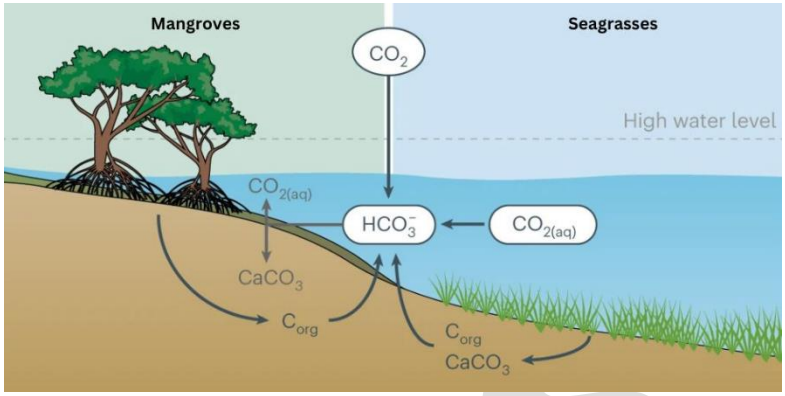
Q9. Answer

Approach
- Give a brief introduction to mangrove ecosystems.
- Explain their role in climate change mitigation, focusing on carbon sequestration.
- Discuss their role in climate change adaptation, focusing on coastal protection and resilience.
- Conclude by highlighting their importance as a nature-based solution.

Introduction
Mangroves are salt-tolerant trees and shrubs that grow in coastal, tropical, and subtropical regions, forming dense forest ecosystems in intertidal zones where land and sea meet. They play a critical, dual role in addressing climate change by both mitigating its causes and helping coastal communities adapt to its impacts.
Body
Role in Climate Change Mitigation:

- **Blue Carbon Sinks:** Mangroves are among the most carbon-rich forests in the tropics. They are termed "blue carbon" ecosystems because they capture and store vast amounts of carbon from the atmosphere and oceans.
- **High Carbon Storage:** They sequester carbon at a rate two to four times greater than mature tropical forests. While a significant amount of carbon is stored in their biomass (trunks, branches, and roots), the majority is trapped in the rich, organic soil beneath them.
- **Long-term Sequestration:** The waterlogged, low-oxygen soil of mangrove forests slows down the

decomposition of organic matter, allowing carbon to be locked away for centuries or even millennia. The destruction of these ecosystems releases these massive carbon stores back into the atmosphere as carbon dioxide.



Role in Climate Change Adaptation:

- **Coastal Defense:** The dense and complex network of mangrove roots and trunks acts as a natural barrier. They scatter wave energy from storm surges, cyclones, and tsunamis, reducing their destructive force and protecting coastal communities and infrastructure.
- **Erosion Control:** Mangrove roots bind and stabilize the soil, preventing coastal erosion. This is crucial for maintaining the integrity of coastlines, especially with rising sea levels.
- **Adapting to Sea-Level Rise:** By trapping sediment from rivers and tides, mangroves gradually build up the elevation of the coastline. This natural process of land accretion helps coastal areas keep pace with a moderate rate of sea-level rise.
- **Supporting Livelihoods and Biodiversity:** Mangroves serve as vital breeding grounds and nurseries for a diverse range of marine life. This supports coastal fisheries, ensuring food security and providing resilient livelihoods for communities vulnerable to the economic shocks of climate change.

Conclusion

Mangroves are a powerful and cost-effective **nature-based solution** for tackling climate change. Their role in both sequestering enormous amounts of carbon and protecting coastlines from climate-related hazards makes their conservation and restoration a critical strategy. Protecting these vital ecosystems is not just an environmental priority but also a fundamental investment in a climate-resilient future for coastal populations worldwide.

Q10. Answer

Approach

- Introduce the phenomenon of population aging.
- Discuss the multi-dimensional challenges posed by a rising elderly population.
- Enumerate the key policy responses and critically evaluate their effectiveness.
- Conclude by suggesting a way forward for holistic elderly care.

Introduction

India is undergoing a significant demographic transition, leading to a rapid increase in its elderly population. According to the UNFPA's India Ageing Report 2023, the share of the population over the age of 60 is projected to increase from 10.5% in 2023 to 20.8% by 2050. This "greying of India" presents a complex web of socio-economic, health, and welfare challenges that demand robust policy interventions.

Body

Challenges Associated with an Aging Population:

- **Economic Insecurity:** A vast majority of the elderly workforce comes from the informal sector, with no social security benefits like pensions or gratuity. This leads to high financial dependency, which is deepened by rising inflation and healthcare costs.
- **Health and Healthcare:** The elderly are more susceptible to chronic non-communicable diseases

(NCDs) and degenerative illnesses. India faces a severe shortage of geriatric healthcare infrastructure and specialised medical professionals, leading to high out-of-pocket expenditure on health.

- **Social and Emotional Challenges:** The erosion of the traditional joint family system has increased instances of loneliness, isolation, and emotional distress among the elderly. Cases of elder abuse—physical, emotional, and financial—are also on the rise.
- **Feminization of Aging:** Women generally have a longer life expectancy than men but face greater challenges due to lower literacy rates, limited access to property, and a higher incidence of widowhood, making them more vulnerable in old age.

Government Policy Responses

The Government of India has implemented several policies and programmes to address the needs of its aging population:

- **Legal Framework:** The **Maintenance and Welfare of Parents and Senior Citizens (MWPSC) Act, 2007**, makes it a legal obligation for children to provide maintenance for their parents. It also provides for the establishment of old age homes.
- **Financial Security:**
  - **Indira Gandhi National Old Age Pension Scheme (IGNOAPS):** Provides a monthly pension for senior citizens living below the poverty line.
  - **Pradhan Mantri Vaya Vandana Yojana (PMVVY):** A social security scheme that offers a guaranteed pension for senior citizens.
- **Healthcare and Welfare:**
  - **National Programme for the Health Care of the Elderly (NPHCE):** Aims to provide comprehensive and dedicated healthcare services to the elderly.
  - **Rashtriya Vayoshri Yojana (RVY):** Provides physical aids and assisted-living devices (like walkers and hearing aids) free of cost to senior citizens from Below Poverty Line (BPL) families.

While a policy framework exists, its impact has been limited due to several shortcomings:

- **Implementation Gaps:** The MWPSC Act suffers from low awareness among the elderly and weak enforcement by authorities.
- **Inadequate Coverage and Benefits:** The pension amount provided under schemes like IGNOAPS is nominal and insufficient for a dignified life. Many schemes are targeted only at BPL families, leaving a large number of the "missing middle" vulnerable.
- **Fragmented Approach:** The policy response has been fragmented, with a focus on welfare rather than empowerment. There is a lack of initiatives to promote active and productive aging through reskilling and employment opportunities.
- **Deficient Healthcare Infrastructure:** The NPHCE has not been able to create a robust nationwide geriatric healthcare ecosystem. The availability of specialized geriatric services remains largely confined to a few urban centers, neglecting the rural majority.

Conclusion

While India has a framework for elderly welfare, the policy response remains fragmented, underfunded, and poorly implemented. There is a need to shift from a welfare-based approach to one that promotes active, healthy, and dignified aging. This requires strengthening the public healthcare system for geriatric care, expanding social security nets, and promoting an age-friendly social environment to ensure that the elderly live a life of dignity and security.

Q11. Answer

Approach

- Give a brief introduction highlighting the unique temple culture of Odisha.
- Discuss the profound religious significance of these temples, citing key examples like the Jagannath and Lingaraj temples.
- Analyze the multifaceted social, cultural, and economic roles played by the temples.
- Conclude by summarizing how temples function as the nerve centers of Odia life.

Introduction

Odisha, often called the "Land of Temples," is renowned for its magnificent Kalinga architecture and a deep-rooted temple culture that has shaped its civilization for centuries. These temples are not merely architectural marvels or places of worship; they are living, breathing institutions that form the very nucleus of the socio-religious, cultural, and economic life of the Odia people.

Body

Religious Significance:

- **Epicenters of Pilgrimage and Faith:** The Jagannath Temple in Puri is one of the four most sacred pilgrimage sites (*Char Dham*) for Hindus, attracting millions of devotees annually. Similarly, the Lingaraj Temple in Bhubaneswar is a paramount center for Shaivism.
- **Hub of Diverse Sects:** Odishan temples are a confluence of various Hindu sects. While the Lingaraj Temple is a prominent center of Shaivism, the Jagannath cult represents a unique form of Vaishnavism that has syncretically absorbed elements of Shaivism, Shaktism, Buddhism, and even tribal traditions. This makes the religion practiced here inclusive and unique.
- **Living Deities and Rituals:** The deities in major temples are treated as living beings with elaborate daily rituals (*nitis*), from morning ablutions to the final retiring ceremony at night. This anthropomorphic worship promotes a deep, personal, and continuous connection between the devotee and the divine.

Socio-Cultural and Economic Significance:

- **Hubs of Art and Architecture:** Temples are the greatest repository of Odia art and architectural genius. The elaborate carvings on temple walls depict not only mythological stories but also scenes from contemporary social life, making them invaluable historical records. The Konark Sun Temple, a UNESCO World Heritage Site, stands as a testament to this artistic excellence.
- **Patronage of Performing Arts:** Temples have been the cradle of Odisha's classical performing arts. The **Odissi dance** form has its roots in the temple tradition of the *Maharis* (temple dancers). The Jagannath Temple also patronized the *Gotipua* dance tradition.
- **Economic Nerve Centers:** The temple ecosystem sustains the local economy.
    - **Employment:** It provides direct and indirect employment to a vast number of people, including priests (*sevayats*), cooks, artisans, garland makers, and administrators.
    - **Handicrafts:** Crafts like **Patachitra** painting, Pipili's appliqué work, and stone carving are intrinsically linked to the temples, especially the Jagannath cult, providing livelihoods to thousands of artisans.
    - **Tourism:** The "Golden Triangle" of Bhubaneswar (the Temple City), Puri (the Spiritual Capital), and Konark (the Sun Temple) is the backbone of Odisha's tourism industry. This pilgrimage and heritage tourism supports a wide range of ancillary sectors like hospitality, transport, and guide services, contributing significantly to the state's economy.

Centers of Social Integration and Identity: The temple plays a vital role in social life.

- **The Great Kitchen:** The kitchen of the Jagannath Temple, which prepares the *Mahaprasad* for thousands daily, is a great social leveler. The tradition of partaking in this sacred food together promotes a sense of community and erodes caste rigidities.
- **Odia Identity:** Lord Jagannath is considered the Lord of Odisha and the foremost symbol of Odia identity. The temple culture binds the people together in a shared spiritual and cultural heritage.

Conclusion

Temples in Odisha are far more than just places of worship. They are dynamic, multi-dimensional institutions that are inextricably woven into the fabric of Odia life, shaping its spiritual beliefs, social structure, cultural expressions, and economic sustenance. They are the enduring symbols of a rich heritage and a continuing, living tradition.

Q12. Answer

Approach

- Introduce the concept of urbanization in India, highlighting its dual nature.
- Discuss the opportunities and challenges presented by rapid urbanization.
- Critically analyze the key government initiatives to manage urban growth.
- Suggest a way forward for sustainable and inclusive urban development.
- Conclude with a balanced summary.

Introduction

Urbanization is a transformative process that involves the shift of population from rural to urban areas, leading to the growth of cities and towns. For India, this process is central to its economic and social development, presenting a landscape of opportunities intertwined with significant challenges.

Body

Opportunities Presented by Urbanization

- **Engines of Economic Growth:** Cities contribute nearly 60% of India's Gross Domestic Product (GDP) while occupying only 3% of land, highlighting their role as hubs of productivity and innovation. They offer economies of scale and attract investment, promoting industrial and service sector growth.
- **Social Mobility and Empowerment:** Urban centers provide better access to education, healthcare, and skill development opportunities, enabling social mobility and improving the quality of life for many.
- **Infrastructure and Technological Advancement:** Urbanization drives the development of modern infrastructure, including transportation, communication, and digital networks, which are crucial for national progress.

Challenges of Urbanization:

- **Overburdened Infrastructure:** Rapid and often unplanned urban growth has led to a severe strain on infrastructure, resulting in housing shortages, the proliferation of slums, traffic congestion, and inadequate water and sanitation facilities.
- **Environmental Degradation:** The concentration of population and economic activities has caused high levels of air and water pollution, challenges in solid waste management, and the loss of green spaces, leading to an urban heat island effect.
- **Socio-Economic Issues:** Urban areas witness rising inequality, higher crime rates, and social fragmentation. The urban poor, living in informal settlements, face a lack of tenure security and limited access to basic services.

Government Initiatives

- **Smart Cities Mission:** Aims to develop 100 cities with core infrastructure, a clean and sustainable environment, and smart solutions. The mission's progress has been uneven, and its "area-based development" model has been criticized for creating pockets of development rather than city-wide transformation.
- **AMRUT (Atal Mission for Rejuvenation and Urban Transformation):** Focuses on providing essential infrastructure like water supply, sewerage, and urban transport to over 500 cities. While it has improved basic service delivery, challenges in project implementation and last-mile connectivity persist.
- **Pradhan Mantri Awas Yojana - Urban (PMAY-U):** Seeks to provide "Housing for All". The scheme has faced hurdles related to land acquisition, affordability for the economically weakest sections, and ensuring the quality of housing units.
- **Swachh Bharat Mission - Urban (SBM-U):** Aims to make urban India open defecation free (ODF) and improve solid waste management. While it has achieved success in toilet construction, scientific processing of solid waste remains a major challenge for most cities.

Way Forward for Sustainable Urbanization:

- **Integrated and Holistic Planning:** There is a need to move from project-based solutions to long-term, integrated urban planning that links housing, transportation, and economic opportunities. A focus on developing Tier-II and Tier-III cities can help decentralize urban growth.
- **Empowerment of Urban Local Bodies (ULBs):** The principles of the **74th Constitutional Amendment Act** must be implemented in letter and spirit by devolving more funds, functions, and functionaries to ULBs, making them financially self-reliant and administratively capable.
- **Focus on Sustainable Infrastructure:** Future urban development should prioritize green buildings, efficient public transport systems, circular economy models for waste management, and water conservation techniques like rainwater harvesting.
- **Inclusive and Participatory Governance:** Urban planning must be inclusive, addressing the needs of the urban poor, women, children, and the elderly. A participatory approach involving citizens in decision-making can lead to more effective and equitable outcomes.
- **Leveraging Technology:** The use of modern technologies like GIS for planning, data analytics for traffic management, and smart grids for energy can significantly improve the efficiency of urban services.

Conclusion

The success of India's urban transition will depend on the ability to move beyond fragmented schemes towards a holistic, sustainable, and inclusive development model, powered by empowered local governments and active citizen participation.

Group B

Q13. Answer

Approach

- Introduce the significance of the Himalayan ecosystem.
- Explain how climate change impacts this vulnerable ecosystem with specific examples.
- Discuss the steps taken by the government to address these challenges.
- Provide a way forward with concrete suggestions for sustainable management.

Introduction

The Himalayas, also called the "Third Pole," are a vital global ecosystem, supporting the livelihoods of millions and regulating regional climate patterns. However, this fragile mountain ecosystem is disproportionately affected by climate change, facing accelerated warming at a rate higher than the global average. This vulnerability poses environmental and socio-economic challenges.

Body

Vulnerability of the Himalayan Ecosystem to Climate Change

Glacial Retreat and Water Insecurity: The Himalayas are home to one of the world's largest bodies of ice and snow. Accelerated warming is causing rapid glacial melting.

- This initially increases water flow, leading to a higher risk of **Glacial Lake Outburst Floods (GLOFs)**, as seen in the 2021 Chamoli disaster. In the long run, it threatens the perennial flow of major rivers like the Ganga, Indus, and Brahmaputra, jeopardizing water security for over a billion people downstream.

Impact on Biodiversity: The unique altitudinal gradients of the Himalayas host diverse flora and fauna. Climate change is disrupting this delicate balance.

- Rising temperatures are forcing species to migrate to higher altitudes, leading to habitat loss and increased competition. For example, studies show apple cultivation is shifting to higher regions in Himachal Pradesh, while traditional crops face decline. Endemic species with narrow habitat ranges are at high risk of extinction.

Increased Frequency of Extreme Weather Events: Climate change is intensifying weather patterns, resulting in more frequent and severe natural disasters.

- The region is experiencing a rise in cloudbursts, flash floods, landslides, and forest fires. The devastating Kedarnath floods in 2013 and landslides in Sikkim are reminders of this increased vulnerability, which is exacerbated by unregulated construction and tourism.

Changes in Weather Patterns and Agriculture: The monsoon patterns, crucial for the region's agriculture, are becoming more erratic.

- Altered rainfall and snowfall patterns affect the agrarian economy, which is the mainstay for the local population. This leads to crop failure, reduced yields, and increased food insecurity, forcing communities to abandon traditional farming.

The Indian government has launched several initiatives to address climate change in the Himalayan region:

- **National Action Plan on Climate Change (NAPCC):** This framework includes the **National Mission for Sustaining the Himalayan Ecosystem (NMSHE)**, which focuses on scientific research, monitoring, and capacity building to understand and mitigate climate change impacts.
- **Promotion of Renewable Energy:** Initiatives like the **National Solar Mission** and schemes to promote hydro-power projects aim to reduce the carbon footprint in the region.
- **Disaster Management and Early Warning Systems:** The **National Disaster Management Authority (NDMA)** has issued guidelines for managing GLOFs and landslides. Efforts are being made to install Doppler radars and other early warning systems in vulnerable areas.
- **Afforestation and Conservation Programs:** The **National Mission for a Green India** and various state-level afforestation drives aim to increase forest cover, which helps in carbon sequestration and slope stabilization.

Way Forward

- **Strengthening Scientific Research:** There is a need for more specific, data-driven research to create climate vulnerability maps at the local level. Institutions under NMSHE must be empowered with more funding and autonomy.

- **Integrating Climate Adaptation with Development:** Development projects in the Himalayas, particularly related to infrastructure like roads and dams, must undergo rigorous environmental and climate impact assessments. The current model of development exacerbates climate vulnerability.
- **Community-Centric Adaptation:** Local communities possess invaluable traditional knowledge for adapting to environmental changes. Adaptation strategies should be co-designed with their participation, ensuring that solutions like rainwater harvesting, crop diversification, and sustainable tourism benefit them directly.
- **Regional Cooperation:** The Himalayas span multiple countries. Climate change does not respect political boundaries. A collaborative mechanism involving all Himalayan nations (e.g., through platforms like ICIMOD) is essential for sharing data, managing transboundary rivers, and coordinating disaster response.
- **Sustainable Finance and Tourism:** Innovative financial mechanisms like green bonds should be explored to fund climate adaptation projects. A regulatory framework for sustainable tourism is needed to limit the ecological footprint of this growing industry.

Conclusion

The Himalayan ecosystem is at a critical juncture where the consequences of inaction are catastrophic. A shift from a purely developmental to a sustainable, climate-resilient approach is required to protect this vital natural heritage for future generations.

Q14. Answer

Approach

- Discuss Odisha's rivers as the state's lifeline, crucial for both its economy and ecology.
- Evaluate the specific impacts of sand mining on the physical and ecological health of the rivers.
- Evaluate the specific impacts of industrial effluents on the chemical and biological health of the rivers.
- Summarize the consequences and emphasize the urgent need for a balanced approach that combines stringent regulation with sustainable development.

Introduction

The rivers of Odisha, including the Mahanadi, Brahmani, and Baitarani, are the state's lifelines, supporting agriculture, providing drinking water, and nurturing rich biodiversity. However, these vital water systems are facing a dual crisis due to illegal extraction of sand, and the discharge of industrial effluents.

Body

The Impact of Sand Mining

- **Riverbed Degradation and Bank Erosion:** Excessive sand mining deepens the river channel, a process known as **riverbed incision**. This alters the river's natural flow and increases the velocity of the water, leading to erosion of the riverbanks. This causes the loss of valuable agricultural land and threatens the stability of bridges and other riverside infrastructure.
- **Destruction of Aquatic Habitats:** The riverbed and sandbars serve as the breeding and

nesting grounds for aquatic life, including fish, turtles, and the critically endangered gharial in the Mahanadi river system. Sand mining physically destroys these habitats, leading to decline in biodiversity.

- **Lowering of the Groundwater Table:** A river's bed is directly connected to the surrounding groundwater aquifers. When the riverbed is deepened through mining, the groundwater table also drops. This dries up the wells in nearby villages, creating a severe drinking water crisis and impacting irrigation for farmers.
- **Increased Salinity Intrusion:** In the deltaic regions where rivers meet the sea, sand mining reduces the natural "hydraulic pressure" of the freshwater flowing outwards. This allows saline water from the Bay of Bengal to intrude upstream, contaminating freshwater sources and rendering agricultural land infertile. This is a growing concern in the Mahanadi delta.

The Impact of Industrial Effluents

- The industrial belts of Odisha—particularly the coal and power hub of **Angul-Talcher** and the steel and mining cluster of **Jajpur-Kalinganagar**—are located along major rivers. The discharge of poorly treated or untreated industrial wastewater has turned long stretches of these rivers into toxic drains.
- **Chemical and Heavy Metal Contamination:** Industries like steel plants, thermal power plants, and mining operations release effluents laden with toxic **heavy metals** such as chromium, lead, mercury, and arsenic. The **Central Pollution Control Board (CPCB)** has repeatedly identified the stretch of the **Brahmani River** flowing through these industrial clusters as "critically polluted." These heavy metals are persistent (they do not break down) and accumulate in the riverbed sediment.
- **Bioaccumulation and Public Health Crisis:** The toxic metals are absorbed by aquatic plants and small fish, and their concentration increases at each level of the food chain, a process called **biomagnification**. When humans consume this contaminated fish or use the polluted water, these toxins accumulate in their bodies, leading to severe long-term health problems, including **kidney failure, neurological disorders, and cancer**.
- **Oxygen Depletion and "Dead Zones":** The discharge of organic waste from industries increases the **Biochemical Oxygen Demand (BOD)** of the river; means that the microbes that decompose this waste consume the dissolved oxygen in the water. This oxygen depletion suffocates fish and other aquatic life, creating "dead zones" where no complex life can survive. **Thermal pollution**—the release of hot water from thermal power plants—further reduces the oxygen-holding capacity of the river, exacerbating the problem.

The destructive impacts of sand mining and industrial effluents are not separate; they reinforce each other in a deadly synergy. A river that has been deepened and destabilized by sand mining has a reduced flow and a lower volume of water. This **reduces the river's natural capacity to dilute and flush out pollutants**, making the industrial effluents more concentrated and far more toxic.

Conclusion

The twin pressures of unscientific sand mining and the indiscriminate discharge of industrial effluents are inflicting a severe and possibly irreversible blow to the health of Odisha's rivers. This is not just an environmental issue; it is a deep socio-economic crisis that threatens the livelihoods of millions of farmers and fisherfolk and poses a grave, long-term public health risk to the population.

Q15. Answer

Approach

- Give a brief introduction to the Odia language, its linguistic family, and its classical status.
- Trace its evolution chronologically through distinct historical periods.
- Highlight key literary figures and works that shaped the language in each period.
- Discuss the current status of the language.
- Conclude by summarizing its journey of resilience and growth

Introduction

Odia is an Eastern Indo-Aryan language belonging to the Indo-European language family. It is the predominant language of Odisha and is spoken by over 40 million people. Recognized for its long literary history and lack of significant borrowing from other languages, Odia was designated the sixth 'Classical Language of India' in 2014.

Body

Evolution of the Odia Language

Proto-Odia (Prior to 10th Century AD)

- The roots of the Odia language lie in the Odra Prakrit, which evolved from Magadhi Prakrit. While distinct literary works from this period are absent, its early form can be seen in inscriptions, particularly those from the 7th century onwards.
- The earliest evidence of the language is found in rock edicts and temple inscriptions. The Charyapadas, a collection of 8th-12th century mystical poems from Eastern India, also contain linguistic features that are considered precursors to Odia, Bengali, and Assamese.

Old Odia (10th to 13th Century)

- This period marks the emergence of Odia as a distinct language. Inscriptions from this era, such as the Urajam inscription of the Ganga dynasty king Anantavarman Chodaganga Deva (11th century), provide clear evidence of early Odia prose.
- The language of this period was heavily influenced by Prakrit and Apabhramsa, with a simple sentence structure and vocabulary.

Early Middle Odia (13th to 15th Century)

- This was a transformative era for the language, due to the contributions of Sarala Dasa, revered as the 'Adi Kabi' or the first great poet of Odia literature.
- **Sarala Dasa's Mahabharata:** In the 15th century, Sarala Dasa translated the Sanskrit Mahabharata into colloquial Odia. This was not a literal translation but a creative retelling that incorporated local culture, traditions, and geography.
- **Standardization of Language:** By using the language of the common people, Sarala Dasa made literature accessible and laid the foundation for a standardized literary language, freeing it from the dominance of Sanskrit.

Middle Odia (15th to 17th Century)

- This period is known as the Age of the Panchasakha ('Five Friends'), a group of five Vaishnava poets who profoundly influenced Odia literature and spiritual life.
- **The Panchasakha:** Balarama Dasa, Jagannatha Dasa, Achyutananda Dasa, Ananta Dasa, and Jasobanta Dasa championed the Bhakti movement in Odisha.
- **Jagannatha Dasa's Odia Bhagavata:** His translation of the *Srimad Bhagavata* is a seminal work that achieved immense popularity. Its simple and devotional language standardized the language further and made it a household text across Odisha.

Late Middle Odia (17th to 19th Century)

This era, also known as the *Riti Juga* (Age of Style), was dominated by the works of poets like Upendra Bhanja. This period was characterized by ornamental poetry, intricate wordplay, and stylistic sophistication, demonstrating the language's maturity and capability for complex literary expression.

Modern Odia (Late 19th Century to Present)

The modern period began with the advent of the printing press, the influence of British administration, and a socio-cultural awakening.

- **The Trio of Modern Literature:** The transition to modernity was led by Fakir Mohan Senapati, Radhanath Ray, and Madhusudan Rao. Fakir Mohan Senapati, often called the father of the modern Odia novel and short story, used his works like *Chha Maana Atha Guntha* to address social issues in a powerful, realistic style.
- **Odia Language Movement:** In the late 19th century, a movement was launched to protect the language from attempts to replace it with Bengali in schools and administrative offices. This movement solidified Odia's identity and led to its official recognition.
- **Post-Independence:** After independence, the language continued to flourish with notable contributions from Jnanpith awardees like Gopinath Mohanty, Sachidananda Routray, Sitakant Mahapatra, and Pratibha Ray.

Current Status: Odia is one of the 22 official languages listed in the Eighth Schedule of the Indian Constitution. It is the official language of Odisha and also the official language of West Bengal and Jharkhand.
Contemporary Challenges: Despite its rich heritage, Odia faces challenges from the increasing dominance of English in urban education and professional spheres. There is also a need for greater development of scientific and technical vocabulary to make it a language of modern knowledge.

Conclusion

The journey of the Odia language is a testament to its resilience and adaptability. From its ancient inscriptional origins to the literary masterpieces of Sarala Dasa and the Panchasakha, and the modern prose of Fakir Mohan Senapati, Odia has evolved into a vibrant and cosmopolitan language that continues to be a powerful vehicle of culture, identity, and literature for millions.

Q16. Answer

Approach

- Start with defining cloudburst and highlighting its recent impact.
- Differentiate between a cloudburst and normal rainfall.
- Explain the specific geographical and meteorological factors that make the Himalayas vulnerable.
- Enumerate the steps taken by the government for mitigation and management.
- Discuss the challenges that impede the effectiveness of these measures.
- Suggest a comprehensive way forward.

Conclude by summarizing the need for an integrated and proactive approach

Introduction

A cloudburst is an extreme weather event characterized by intense rainfall over a very short period in a localized area. Recently, states like Himachal Pradesh and Uttarakhand have witnessed devastating flash floods and landslides triggered by such events, leading to loss of life and property.

Body

Cloudbursts vs Normal Rainfall

The primary difference between a cloudburst and normal rainfall lies in the intensity and duration of the precipitation.

	Cloudburst	**Normal Rainfall**
Intensity	Extremely high intensity, defined by the India Meteorological Department (IMD) as unexpected precipitation exceeding 100 mm per hour.	Varies from light drizzles to heavy showers, but the rate is lower than 100 mm/hr.
Duration	Very short, lasting only a few minutes to an hour.	Can last for several hours or even days.
Geographical Area	Highly localized, affecting a very small geographical area, just a few square kilometers.	Covers a much larger, more widespread area.
Formation	Associated with convective clouds (cumulonimbus) that form rapidly due to orographic lift in mountainous terrain, trapping a large amount of moisture that is released suddenly.	Forms from large-scale weather systems like monsoons or cyclonic depressions.
Impact	Leads to sudden and destructive flash floods, landslides, and debris flows due to the sheer volume of water released in a short time.	Generally leads to gradual riverine flooding, allowing more time for response and evacuation.

The unique topography and fragile ecosystem of the Himalayas make the region particularly susceptible to the devastating impacts of cloudbursts.

- **Orography and Topography:** The steep slopes and deep, narrow valleys of the Himalayas are crucial factors. When moisture-laden monsoon winds encounter these steep slopes, they are forced to rise rapidly (orographic lift), leading to the quick formation of dense cumulonimbus clouds. The narrow valleys then channel the immense volume of water from a cloudburst into a destructive flash flood.
- **Fragile Geology:** The Himalayas are geologically young and active mountains, making them prone to landslides. The intense rainfall from a cloudburst saturates the soil and loose rock, increasing the risk of landslides and debris flows. According to the Geological Survey of India, 70% of India's landslides occur in the Himalayas.
- **Climate Change:** Global warming is increasing the atmosphere's capacity to hold moisture and leading to more frequent and intense extreme weather events. Rising temperatures in the Himalayas are contributing to more vigorous convection, thereby increasing the likelihood of cloudbursts.
- **Anthropogenic Factors:** Unplanned and unscientific construction of roads, dams, and buildings,

coupled with widespread deforestation, has destabilized slopes and degraded the natural drainage systems. This exacerbates the impact of flash floods and landslides.

The government has undertaken several measures to mitigate the risks associated with cloudbursts and flash floods.

- **Early Warning Systems:** The India Meteorological Department (IMD) has enhanced its weather forecasting capabilities by installing Doppler Weather Radars in Himalayan states to provide more accurate, area-specific forecasts and nowcasts.
- **National Disaster Management Authority (NDMA):** The NDMA has issued specific guidelines on the management of landslides and flash floods, focusing on hazard zonation, monitoring, and awareness generation.
- **Disaster Response Forces:** Specialized teams of the National Disaster Response Force (NDRF) and State Disaster Response Forces (SDRF) are stationed in vulnerable areas for rapid search and rescue operations.
- **Infrastructure Development:** Increasing focus on building disaster-resilient infrastructure and implementing bio-engineering techniques to stabilize slopes along highways and in vulnerable settlements.

Despite these efforts, significant challenges remain

- **Detection and Forecasting:** Due to their sudden and localized nature, accurately predicting the exact location and time of a cloudburst remains a major scientific challenge. The existing radar network still has gaps in coverage across the vast Himalayan terrain.
- **Last-Mile Connectivity:** Disseminating early warnings to remote and isolated communities with limited access to communication networks is a persistent problem.
- **Unregulated Development:** The enforcement of land-use regulations and building codes in ecologically sensitive zones is weak, allowing unsafe construction to continue.
- **Lack of Community Preparedness:** Low level of awareness and preparedness among local populations and tourists regarding the risks and appropriate responses to flash floods.

Way Forward to build long-term resilience

- **Enhancing Forecasting and Warning Systems:**
  - Increase the density of the Doppler radar network and automatic weather stations for better real-time monitoring.
  - Invest in research and development of AI-based models that can provide more accurate, location-specific forecasts of extreme rainfall.
  - Establish robust, community-level alert mechanisms using a mix of technologies like SMS, mobile apps, and traditional sirens.
- **Sustainable Land-Use Planning:**
  - Strictly enforce zoning regulations based on comprehensive landslide and flood hazard maps, prohibiting construction in highly vulnerable areas.
  - Promote climate-resilient infrastructure and enforce building codes designed to withstand flash floods and landslides.
- **Community Preparedness and Capacity Building:**
  - Conduct regular awareness campaigns and mock drills for local communities and stakeholders, as recommended by the NDMA.
  - Integrate traditional knowledge of local communities in identifying hazard-prone areas and evacuation routes.
- **Ecological Restoration:**

- Undertake large-scale afforestation and soil conservation measures to stabilize slopes and enhance their water absorption capacity.
- Regulate tourism to minimize its environmental impact in ecologically sensitive zones.

Conclusion

Cloudburst disasters in the Himalayas demand more than technological fixes; they require sustainable development, strict regulation, and empowered local communities. Safeguarding this fragile ecosystem is essential to protect lives, livelihoods, and regional stability in the face of escalating climate challenges.

Q17. Answer

Approach

- Start with a brief introduction to the geographical expanse and significance of Odisha's coastal plains.
- Discuss the key dynamic geographical processes that have shaped and continue to modify the region.
- Detail the various natural hazards to which the coast is highly vulnerable, linking them to the geographical features.
- Highlight the state's acclaimed disaster management and mitigation strategies.
- Conclude by summarizing the interplay between the region's dynamic nature, its inherent vulnerabilities, and its acquired resilience

Introduction

The coastal plains of Odisha, stretching over 480 km along the Bay of Bengal, often called the "Hexadeltaic region" or the "Gift of Six Rivers," this area has been formed by the depositional work of the Mahanadi, Brahmani, Baitarani, Subarnarekha, Rushikulya, and Vamsadhara rivers. The riverine deposition and marine forces, making the region geographically active and highly susceptible to a range of natural hazards. This vulnerability is compounded by socio-economic factors, including high population density and reliance on climate-sensitive livelihoods.

Body

The geography of Odisha's coast is in a constant state of flux, driven by several interconnected processes:

- **Delta Formation and Fluvial Action:** The continuous deposition of enormous quantities of sediment by the major rivers creates a low-lying, flat terrain with features like estuaries, sand spits, and mudflats, making it naturally susceptible to flood.
- **Coastal Erosion and Accretion:** The shoreline is continuously reshaped by the interplay of wave action, longshore currents, and sediment supply. While some areas experience progradation (advancement of the coastline), many parts of the Odisha coast, particularly in districts like Kendrapara, face severe erosion that threatens coastal habitats and communities.
- **Unique Hydrological Systems:** The region is home to Asia's largest brackish water lagoon, Chilika Lake, and the Bhitarkanika mangrove ecosystem. These sensitive ecosystems are dependent on a delicate balance of freshwater outflow from rivers and saline water ingress from the sea, a balance disrupted by extreme weather events.
- **Littoral Drift:** Strong currents moving parallel to the coast constantly transport sediment, leading to the formation of sand dunes and barrier spits, which are themselves dynamic and subject to change during storm events.

The dynamic geography of the coastal plains directly contributes to their high vulnerability to a range of natural disasters:

- **Tropical Cyclones:** Bay of Bengal, a global hotspot for cyclogenesis, Odisha is India's most cyclone-

prone state. The low, flat topography allows for deep inland penetration of destructive winds and storm surges. The state has a history of devastating cyclones, including the 1999 Super Cyclone and more recent ones like Fani (2019) and Dana (2024).

- **Flooding and Storm Surges:** The combination of heavy cyclonic rainfall and overflowing river systems frequently causes widespread flooding in the deltaic regions. Storm surges, which are abnormal rises in sea level generated by cyclones, flood low-lying coastal land with saline water, destroying crops and contaminating freshwater sources
- **Tsunamis:** The eastern coast of India is susceptible to tsunamis originating from the seismically active Andaman-Sumatra trench. Following the 2004 Indian Ocean tsunami, Odisha has been identified as a vulnerable state, leading to enhanced preparedness in coastal villages.
- **Coastal Erosion:** Accelerated by rising sea levels and intense wave action during cyclones, coastal erosion poses a direct threat to fishing villages, infrastructure, and vital ecosystems like the mangrove forests that act as natural barriers.

Despite its high vulnerability, Odisha has transformed its disaster management approach since the 1999 Super Cyclone, earning global recognition. This "Odisha Model" is built on proactive governance and community participation.

- **Institutional Framework:** The establishment of the Odisha State Disaster Management Authority (OSDMA) in 1999 to create a robust, multi-layered framework for disaster response and mitigation, earning the Subhash Chandra Bose Aapda Prabandhan Puraskar in 2023.
- **Early Warning Systems:** Odisha has invested heavily in technology for timely and accurate warnings. This includes the Early Warning Dissemination System (EWDS) and the mobile app SATARK (System for Assessing, Tracking, and Alerting Disaster Risk Information based on Dynamic Risk Knowledge), ensuring last-mile connectivity.
- **Resilient Infrastructure:** Under the **National Cyclone Risk Mitigation Project (NCRMP)**, Multipurpose Cyclone Shelters (MPCS) have been constructed along the coast, along with approach roads and saline embankments. These structures have proven crucial in achieving a 'zero-casualty' target in recent cyclones.
- **Nature-Based Solutions:** The **Integrated Coastal Zone Management (ICZM) Project**, supported by the World Bank, focuses on strengthening natural defenses. Key activities include mangrove afforestation in areas like Bhitarkanika and Paradip-Dhamra, conservation of the Chilika ecosystem, and protecting Olive Ridley turtle nesting sites.
- **Community Preparedness:** The state has built a strong community-based disaster response system, including the Odisha Disaster Rapid Action Force (ODRAF) and training for Cyclone Shelter Management and Maintenance Committees (CSMMC) and local volunteers under schemes like Aapda Mitra.

Conclusion

Odisha's journey shows how turning vulnerabilities into opportunities through proactive resilience-building can transform a disaster-prone coastline into a global model of coastal preparedness and sustainability.