

Name Of Candidate

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Roll No.

1910101590

Date:

9 Feb 2023

Time Allowed: One and Half Hours

Maximum Marks: 125

INDEX TABLE

INSTRUCTION

Q. No. Max. Marks Marks Obtained

1

2

3

4

5

6

7

8

9

10

Total: 125

1. Please do furnish Name, Email, Roll No and Mobile in the answer sheet.

2. There are TEN questions printed in ENGLISH & HINDI, all questions are compulsory.

3. The number of marks carried by a question/part is indicated against it.

4. Answers must be written in the medium authorized in the admission Certificate, which must be stated clearly on the cover of this Question-Cum-Answer (QCA) Booklet in the space provided.

5. Word limit in questions, if specified, should be adhered to. Any page or portion of the page left blank in the Question-Cum Answer Booklet must be clearly Struck off.

Any specific messages for ForumIAS Mentors/Evaluators with respect to your copy? Write it here.

Evaluator's Discretion:

For Student Only

Start Time | 9 am

End Time | 10:30 am

Total Marks:

Mode Of Examination:

Online Offline

Evaluator's Discretion: This is the marks awarded at the discretion of the evaluator based on your overall impression, on the basis of (but not limited to) your handwriting, presentation, use of diagrams, flowcharts, facts and figures or absolutely anything that he/she liked in your copy.

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 Forum IAS 

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Ans.

Air mass : Huge pocket of air with distinct temperature, pressure, humidity with respect to surrounding air. It can extend over 1000s of kms horizontally and even upto stratosphere vertically.

Front : Zone of transition between two air masses

Air mass

associated weather pattern

1. warm



- (i) anti-cyclonic
- (ii) heat waves
eg. air mass originating over Africa and deserts leads to high temp. over Europe.

2. cold

- (i) cyclonic
- (ii) weather India → foggy winters

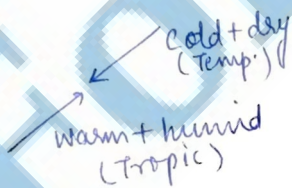
3. maritime

- (i) warm & humid conditions
eg. along caribbean islands

4. continental

- (i) hot & dry
eg. SW USA and Mexico

5. regional



- (i) formation of temperate cyclones

Air fronts are also of different types depending on nature of the interacting air masses :-

Air front

Formation

associated weather pattern

1. cold

when cold air mass replaces the warm air mass by advancing into it or the warm air mass retreats & cold advances.
(steep slope)

→ strong winds
→ cumulo-nimbus clouds & sudden drop in temperature bringing heavy precipitation
eg. thunderstorm in USA

2. Warm

warm air mass ascends slowly over cold one
(gentler slope)

→ moderate to gentle precipitation over large area

3. Stationary
&

Two air masses collide but are unable to push against each other

→ produces clouds for prolonged period (prolonged precipitation)

4. Occluded

cold air mass overtakes warm air mass & goes underneath it

→ complex weather; a mix of cold front type & warm front type
eg. west Europe

Together, air masses & fronts modify weather patterns globe-around.

Ans 4

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Renewable energy refers to energy derived from sources which can be replenished on human time-scale. Due to burning issue to climate change, such resources like solar, wind, etc are becoming the beacon of sustainable growth and development, due to their potential :-

- reduction in GHG emissions (CO_2 , etc.)
- prevent ecological damage
eg. deforestation due to mining coal
- Employment generation
eg. PV modules (Atmanirbhar Bharat)
- Reduce pollution, hence prevent health issues due to NO_x , SO_x , etc.
- meeting global commitments eg. INDC to become net zero.

Though clean energy is the need of the future, fossil fuels are inevitable :-

- Cheap source of energy
- developmental needs to tackle poverty
- target to become developed by 2047 and increase over \$ 5 trn for industrial growth
- limited technological knowhow & financial adequacy.
eg. India highlighted need of climate finance at COP 26

186875_61116_1910101590_(2023-04-26 03:18:24) → limited reliability to ensure seamless supply of electricity by renewable resources
eg. poor grid connectivity.

→ Environmental challenges

- eg. Hydro power plants may affect river ecology
- eg. wind farms may have negative impact on aerial fauna.

For efficient transition to greener technologies, there is need of :-

1. Boost Technological research
eg. India - UK green energy collaboration
2. Innovative solutions
eg. India - EU partnership - green hydrogen
eg. EVs
3. Increase reliance on nuclear fuels, biofuels. eg. ethanol blending
4. Behavioural changes
eg. Life Time Transit orientated development
5. greater transfer of climate finance by developed nations in line with UNFCCC commitments

Dual development transition is needed i.e. cleaner & greener sources without compromising economic & social goals. to lead India on path of developed nation by 2047.

Mangroves are salt tolerant vegetation which grow in inter-tidal regions of rivers & estuaries.
eg. Sunderbans.

Significance for coastal ecology

① Ecosystem services

eg. cycling nutrients, uptake pollutants (called KIDNEYS OF THE EARTH)

② Natural coastal defence
natural barriers in tsunami, storm surge, protect communities

③ Carbon sinks

carbon sequestration more than tropic forest

④ rich biodiversity

above & below waterline
eg. Bengal tiger in Sunderbans

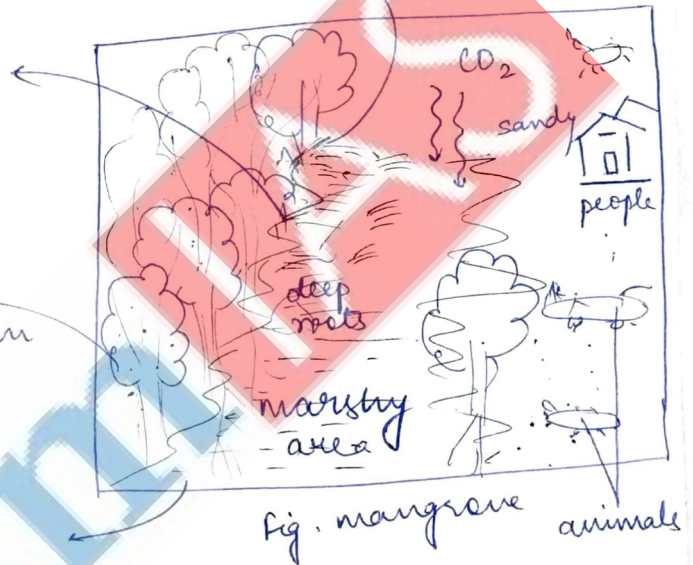


Fig. mangrove

Significance in coastal economy

1. Wood for construction, pulp, charcoal (insect resistant & rot resistant)

2. Medicinal value of herbs

3. Livelihood support

eg. animal fodder, wax, honey, fish, crabs etc. (80% of global fish catch ^{relies} on mangroves)

4. Eco-tourism & adventure sports

eg. birdwatching

As per IISc researchers, India has lost 40% of its mangrove area in last century.

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Reasons for accelerated depletion

- Agriculture → land clearing
→ synthetic chemicals, run-offs.
- Aquaculture → coastal fishing, intensive shrimp culture
- Developmental needs → roads, residential, tourism, ports etc.
- Pollution → air, plastic, solid wastes suffocate aerial roots
- Climate change → mangroves are very sensitive to changes in oceanic properties

Way forward

<u>Individual</u>	<u>Societal</u>	<u>National</u>	<u>International</u>
awareness generation appreciation	reduce anthropogenic pressure; coastal industries	proper monitoring. schemes like MISTHI, MIRA	UNEP, GAM (Global Alliance for mangroves)

There is need of "efficient dialysis" to save the "kidneys of the earth".

Ans. 9

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Wetlands refer to low areas temporarily / permanently flooded with water. Such ecosystems provide livability, water quality, habitat, carbon sequestration improving services. When in or around cities, they are called urban wetlands.

As per Wetlands International, ~30% natural wetlands in India have been lost in the last 30 years.

ENVIRONMENTAL IMPACT OF DESTRUCTION OF URBAN WETLAND

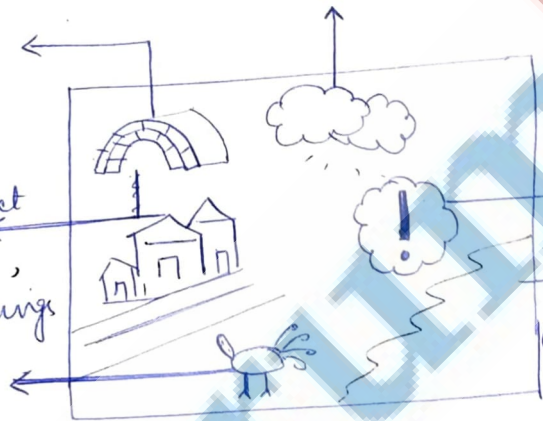
① Air Pollution: as act as natural water filters

⑤ Habitat loss
eg. breeding grounds, fishes, turtles etc

③ Heat Island effect
due to grey infra, glass & concrete buildings

④ Biodiversity loss

(affect 40% global flora & fauna - UNESCO)



② Natural Hazards
eg. Urban floods Chennai (2015)

③ Receding water table
↳ ↓ seepage
↳ ↓ water distress

MEASURES TO CONSERVE & PROTECT WETLANDS

1. Capacity building
 - awareness
 - education
 - ICT
 - civil society groups.

eg. Ramveer Tanwar revived 40 ponds in various states

→ Technology → sewage treatment plants

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→ identification, mapping, monitoring of vulnerable areas using GIS / remote sensing
eg. National Wetland Inventory & Assessment by ISRO mapped ~ 2 lakh wetlands in India

→ Enhanced sustainability of key sectors

→ agriculture
eg. precision farming, nano urea
→ tourism
eg. using electric boats.

→ buffer zones around wetlands

→ de-encroachment
→ improve drainage

→ Integrated policy

→ smart cities mission
→ AMRUT 2.0.
→ green infrastructure (GRIHA ratings)

green-blue policy, urban planning, uphauling & leveraging local experiences can help address drivers of wetland loss and serve as pre-requisites for a climate resilient future.

Interlinking of rivers refers to transfer of water from one river to another for better water management between surplus & deficit regions.

eg. NRLP, India to address water-management

However, this has certain issues:

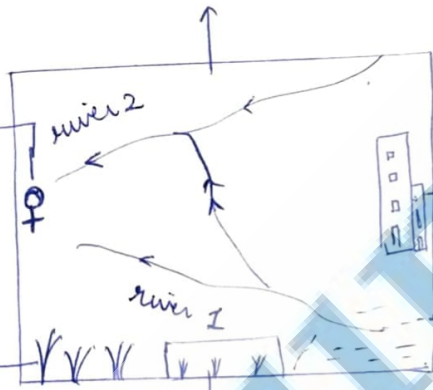
- ③ Climate change
 - rising temperature
 - erratic monsoon
 - DAY ZERO crisis

④ Social inequities

- women → water poverty
- → time poverty
- → have to fetch from miles
- marginalised → drought
- → famine

⑤ Agriculture Demands

- rice, sugarcane
- food security
- ↑ demand leads to interstate river water disputes.



Wasteful consumption

- flood irrigation
- lack of rainwater harvesting

② Urban needs

- encroachment
- water stress
- contamination
- commodification

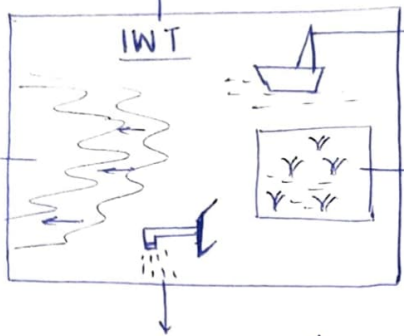
① Depleting sources

- lakes, ponds, etc.
- virtual water export

Inter-linking of rivers offers attractive solutions to multi-dimensional problem of water management in the country in following ways :-

Benefits of linking of waters from INDUS WATER TREATY.

Flood control
eg. in Eastern India (Bihar & Assam)



Transportation & Navigation
→ inland waterways
→ basin management
eg. cleaning Yamuna in Delhi

Irrigation

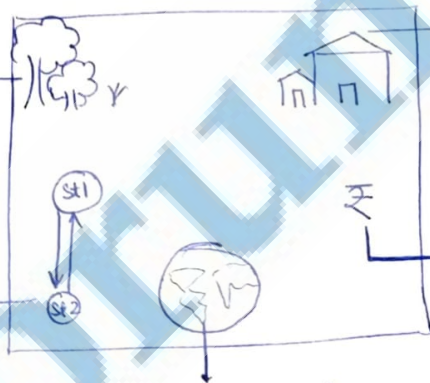
• mitigate drought conditions
eg. 35 mm ha land in western peninsula

Sufficient water supply

- Tap water supply eg JFM
- industrial use.

Such projects though promising have certain challenges :-

Biodiversity & ecological damage
• pollution
• species



Disruption of life & livelihood

- poor, tribals
- need of rehabilitation - challenging

Financial constraints

- NRLP highly capital intensive
- also cost of relief, rehabilitation & resettlement

Inter-State disputes

• Water is a state subject
eg - opposition of Punjab to Satly-Yamuna link canal

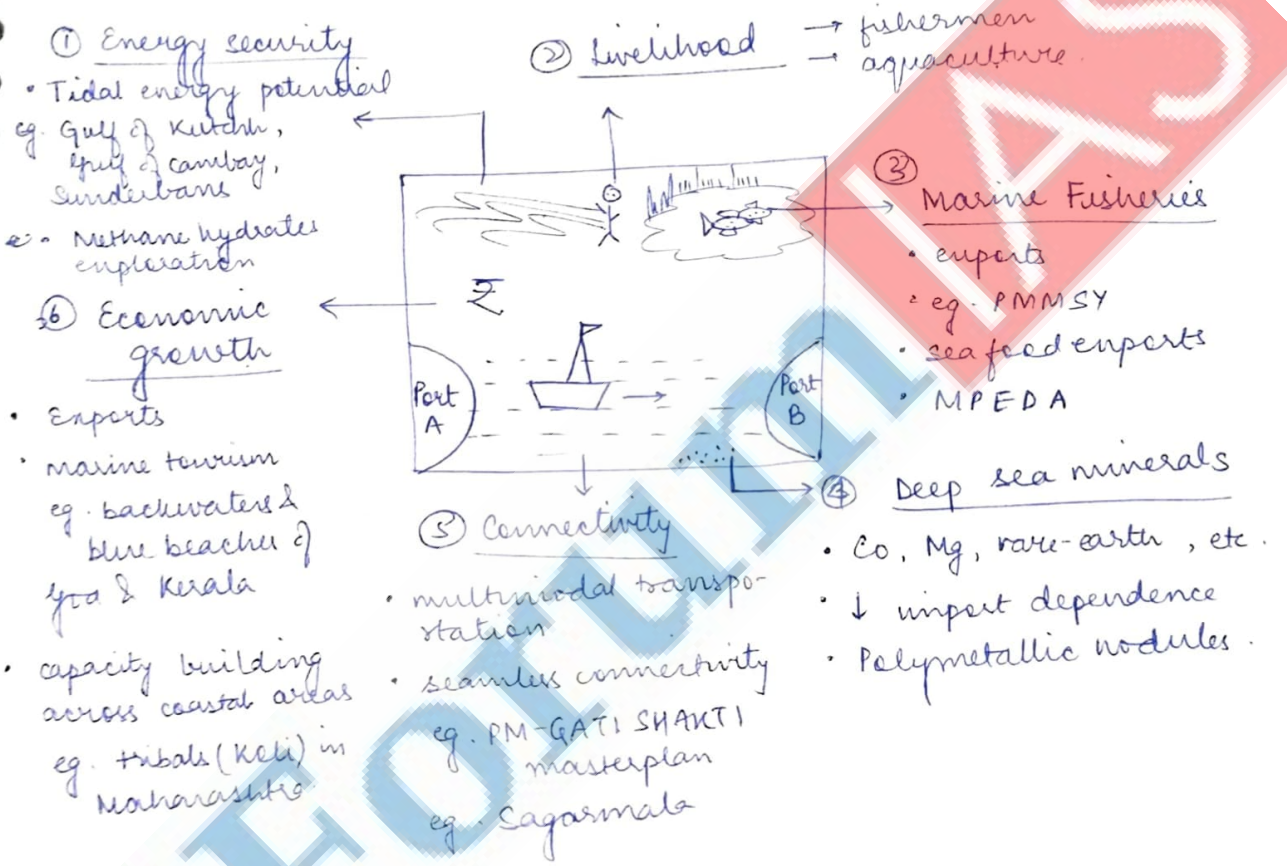
International

- Bhutan, Nepal & Bangladesh
eg. Bangladesh objected to transferring to Ganga (Brahmaputra water)
- Chinese water wars (weaponising water)

Inter-linking can help improve water-management, but is not a panache for all issues which requires a sustainable approach (like life mission) in demand, supply & consumption.

Blue economy refers to sustainable use of ocean resources for economic growth. If the sources are leveraged wisely as a tool for sustainable development, it will serve not only current but also future generations.

Tool to leverage maritime resources for sustainable development



CHALLENGES

1. Limited capacity
 - Human resources eg. lack of training
 - Technological know-how eg. deep sea mining
2. Limited Research & development
 - ↳ educational arena only few institutes
3. Limited funds & finance as it is cost intensive

4. Absence of global rules-based framework

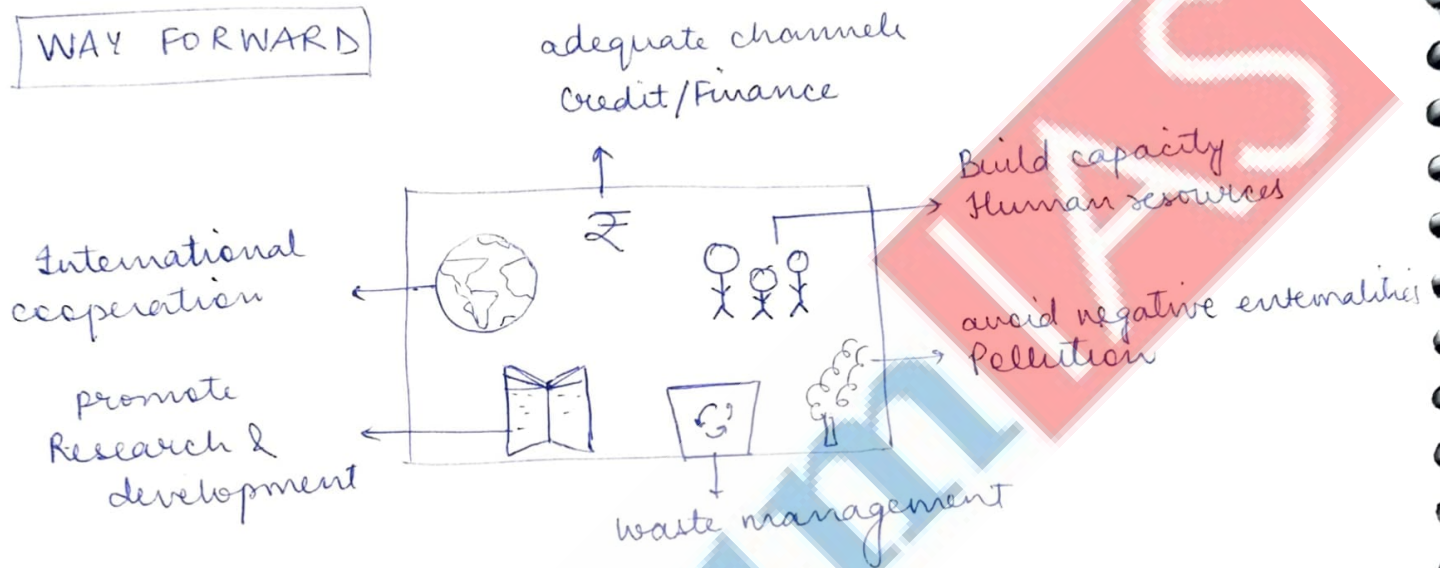
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eg. tussle between India - Sri Lanka over fishermen

5. Environmental concerns

- i. extraction of PM nodules → extinction of rare species
- ii. Cyclones, Tsunamis may undo conceived benefits
- iii. may increase incidents of pollution eg. oil spills.

WAY FORWARD



A 'blue revolution' can pave way to India's growth story and provide better avenues for a developed nation by 2047.

Ans 2.

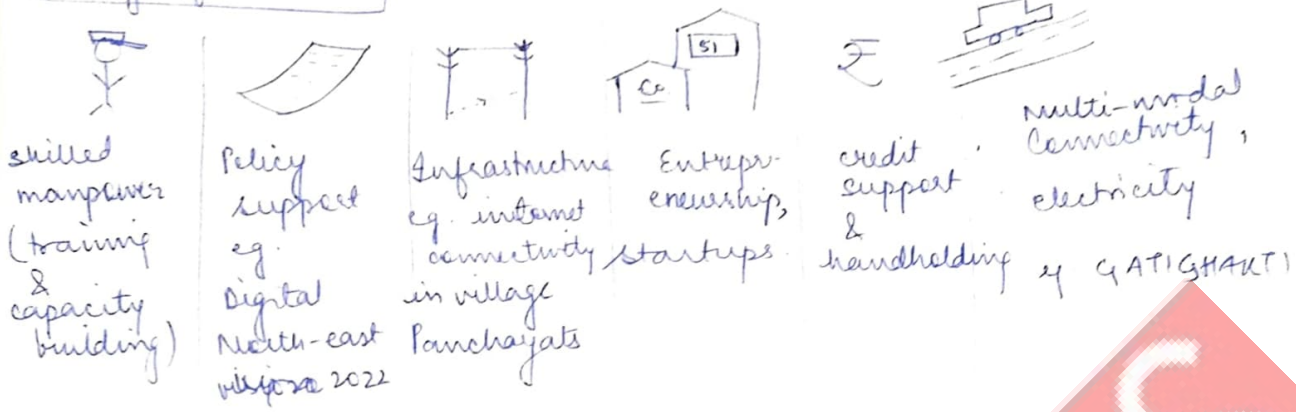
IT industry has been a flag-bearer in socio-economic revolution/transformation in India's ~~service~~ sector.

Favourable conditions that facilitated growth

- A. Climate → Bangalore (KN) like Silicon Valley (USA)
- B. Language → English familiarity
- C. Skills → especially hubs like Chennai, Gurgaon, etc
- D. Government Policies
 - LPG reforms (1991)
 - Export Oriented Units
 - Software Technical Parks
 - Removal of duties from IT products
 - Infrastructure → Make in India, Smart Cities mission, Digital India
- E. Innovative entrepreneurship → eg. Narayan Murthy (Infosys)

Tier 2 and Tier 3 cities see limited penetration as :-

1. Poor supply chain infrastructure eg. internet
2. Lower socio-economic indicators
 - (i) poverty eg. difference in PCI of UP & Karnataka
 - (ii) education, etc.
3. Climatic conditions are harsh
4. pop-occupied by manufacturing / agriculture
5. Inefficient governance mechanism
6. Lack of connectivity
7. Disruptive power supply



India, if adopts certain reforms, is not far away from its path to power as global knowledge economy.

Ans 3. Temperature inversion refers to increase in temperature as height increases, unlike the normal lapse rate.

Suitable conditions

1. long winter night

terrestrial radiation (TR) > incoming solar radiation (SR)
leads to lower surface temp.

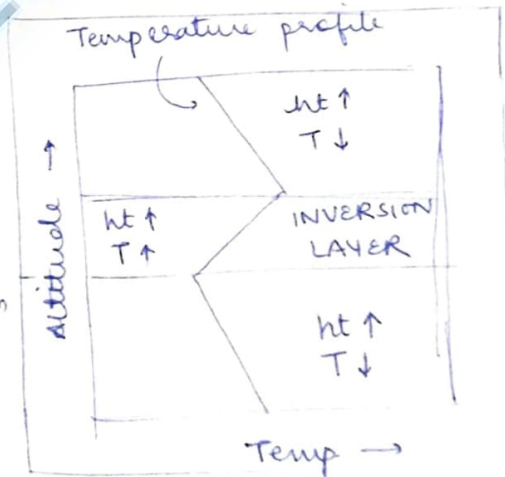


Fig.

2. Cloudless sky at night

→ more rapid heat loss
→ slow air movement prevents intermixing

3. Dry air near ground

→ prevents absorption of radiated heat leading to lower temperatures near the surface

1. Precipitation

- i. convective clouds can't rise high enough, restricting winter rainfall (rabi crops affected)
- ii. stability on western margins of continents (arid conditions) like Sahara desert

2. Fog formation

- i. beneficial to crops like coffee in Yemen hills (Arabia) as protective layer against solar radiation
- ii. urban areas → accumulation of ~~smog~~ dust particles beneath inversion layer ⇒ smog.

3. Increase in ^{air} pollution: Toxic urban air chambers due to non-dispersal of air. eg. Delhi winters (AQI)
Smog lowers visibility, increases accidents, respiratory issues exaggerated by COVID.

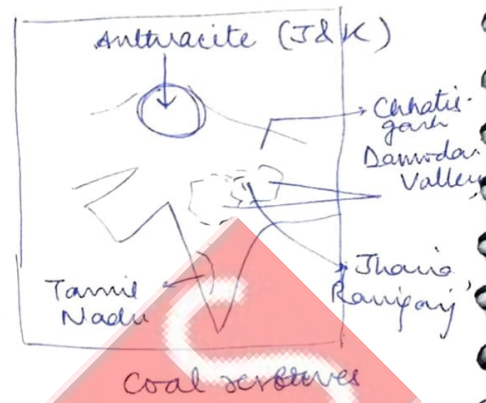
4. Frost damage: Dense cold air moves down the slope to pile up in valley bottom with warm air above. (Air Damage)
Harmful to apple trees.

5. Telecommunication disturbed due to refraction from upper layers.

Thus, the geographical phenomenon of Temperature inversion affects agriculture, transport, communication and other key sectors, thus needs to be better understood & well-managed.

Ans 4 Coal is the most abundant fossil fuel in India. Also called "Black Gold", India is 2nd largest producer & consumer after China.

Despite the reserves, periodic shortages occur due to following reasons:-



1. Fall in imports
 - ↑ international prices due to black swan events (like Russia war)
 - push for "greener alternatives"
 2. Weather
 - flooding of mines during monsoon
 - summers extreme heat → rise in peak load
 3. Quality → domestic production → lignite (50-60% c)
 4. Rising demand → post pandemic recovery (70% electricity demand met from coal)
 5. Logistical issues → disruptions due to reduced availability of railway tracks
 6. Inadequate mining due to government's monopoly (CIL)
- (2021 PSC on Energy report → poor utilization of coal blocks allocated to power sector).

Government measures

1. Open acreage licensing Program

2. Hydrocarbon Exploration Licensing Policy (HELP)

Short Term measures

- faster clearance to pending projects (EIA)
- Real time monitoring app to track demand-supply mismatch
- frequent auctioning
- import subsidies to mitigate short term surge in demand

Long Term measures

- better infrastructure & coordination between NTPC, Railways, CIL etc.
eg. PM GATI shakti
eg. PRAKASH portal
- Supply chain management
- reduce govt. monopoly
- long term contracts with coal producers eg. Russia, Australia, Indonesia
- Dual development → greener + efficient
- energy security - Prioritize border defense.

Augmentation of domestic capacity, better coal management and uphauling renewable energy sources shall better equip India to resolve its energy issues

Ans 5

Lumbering refers to commercial extraction of timber, an important economic activity

Locational factors

1. Raw material → weight losing (by pulp mill, saw mill) → near jungles
2. Rivers → flowing towards direction of market to keep transport cost low. (ports)

3. Infrastructure & Technology

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market viability eg. southern Canada has lumbering industry near newspaper print in USA.

Limited growth in tropical regions as compared to temperate

Tropical

Temperate

Homogeneity of species

less (more heterogeneity)
↓
extractin difficult (dense forest)

more
↓
mechanised operations
extractin easier

Nature of wood

Hardwood difficult to process & transport, even in applications (used in furniture)

softwood (pines, etc.)
easy to transport as floats on water

Riverine transport

meandering



straight & rapid
stepped → faster
transport

need desilting, etc.

good/bad alternative to agriculture

more agriculture
as wood → longer gestation pd.
multiplicrops → in a year

lumbering good alternative as agriculture (poor)

Developed markets

lesser

more
(∴ more demand)

Forest management

lack big game animals

biodiversity hotspots
(limited economic usage for forest conservation)

Scientific principles for sustainable use can help develop more organised approach for lumbering industry.

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Parameters	Excellent	Very Good	Good	Average	Poor	Very Poor
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ADDITIONAL REMARKS

