

Time Allowed : Three Hours
समय : तीन घंटे

ForumIAS

Maximum Marks : 250
अधिकतम अंक : 250

GENERAL STUDIES / सामान्य अध्ययन

Name Of Candidate परीक्षार्थी का नाम	Devdaru		
Roll No./अनुक्रमांक	Medium/माध्यम	English <input checked="" type="checkbox"/>	Hindi <input type="checkbox"/>
Center Code/परीक्षा केंद्र	Date/दिनांक	16/8	

*Center Code : For Online – 1900 / Delhi : Karol bagh - 1901, ORN - 1902, Mukharji Nagar - 1903 / Patna : Boring Rd. - 2001 / Hyderabad : Jawahar Nagar - 2101

INDEX TABLE / अनुक्रमणिका			INSTRUCTION / अनुदेश	
Q. No. प्र.सं.	Max. Marks अधिकतम अंक	Marks Obtained प्राप्तांक		
1			1. Please do furnish Name, Email, Roll No and Mobile in the answer sheet. कृपया उत्तर-पुस्तिका में नाम, ईमेल, रोल नंबर और मोबाइल नंबर भरें।	
2			2. There are TWENTY questions printed in ENGLISH & HINDI, all questions are compulsory. उत्तर पुस्तिका में अंग्रेजी/हिंदी में बीस प्रश्न दिए गए हैं, सभी प्रश्न अनिवार्य हैं।	
3			3. The number of marks carried by a question/part is indicated against it. प्रत्येक प्रश्न/भाग के लिए निर्धारित अंक उसके सामने अंकित किए गए हैं।	
4			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. उत्तर प्रवेश पत्र में अधिकृत माध्यम में लिखे जान चाहिए जो कि दिए गए स्थान में इस प्रश्न-सह-उत्तर (क्यूसीए) पुस्तिका के कवर पर स्पष्ट रूप से लिखा जाना चाहिए।	
5			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. प्रश्नों में शब्द सीमा, यदि निर्दिष्ट हो, का पालन किया जाए। प्रश्न-सह-उत्तर पुस्तिका में खाली छोड़े गये किसी भी पृष्ठ या पृष्ठ के भाग को स्पष्ट रूप से काट दें।	
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Total Marks/कुल अंक :			Mode Of Examination/ परीक्षा की विधि :	Online/ऑनलाइन <input checked="" type="checkbox"/> Offline/ऑफलाइन <input type="checkbox"/>
*Examiner's Discretion is the marks awarded at the discretion of the Examinee 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. मूल्यांकन कर्ता का विवेक अंक आपकी लिखावट, प्रस्तुति आदि के उपयोग, फ्लोचार्ट, तथ्यों और अंकितों या समग्र रूप किसी अन्य विषय पर, जो मूल्यांकन कर्ता को आपकी कॉपी में पसंद आयी के आधार पर (लिखित इसी तक सीमित नहीं) पर दिए गए अंक हैं।			For Office Use Only / केवल कार्यालय प्रयोग हेतु	
ECN CODE/ ईसीएन कोड :		EG/ईजी :		Evaluation Date/ मूल्यांकन तिथि :
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Note: You can discuss your evaluated copy with the mentor (all 7 days, Timings - 11 AM to 6 PM). Further if you are unsatisfied
call or visit the offline centre to meet mentor (all 7 days, Timings - 11 AM to 6 PM). Further if you are unsatisfied
with the evaluation, you can seek re-evaluation of the copy.

EXAMINER'S REMARKS



CRITERIA FOR THE FEEDBACK SECTION AT THE END OF EACH QUESTION

1. **AWIS = Answered What is Asked.** This means whether you have addressed the core demand of the question or not. Addressing the core demand of question gets you an objectively fair score. It is examiner's perception if you have understood the question and if you know the answer in the first place. Creative answer writing, sometimes missing the core demand, may fetch very high or very low scores, and exposes your answer to the subjectivity of the examiner.
2. **CD & VA = Content Density & Value Addition.** Examiner will evaluate the quality and quantity of your content in the answer. In the same word limit or space limit have you (a) written what is asked (b) gone beyond what is asked (c) enriched answers through combination of (but not all!) suggestions, quotes, flowcharts, diagrams, facts and figures, data etc. This affects objective components of assessment.
3. **S & F = Structure & Flow** = Whether you have structured your answer properly or not. Whether the answer has been broken into parts and sub-parts and each part has been addressed appropriately or not. Whether the flow of the answer is maintained. Affects both subjective and objective components of assessment.
4. **P & R =** How your answer performs on the criteria of **presentation, ease of read, clarity and apparent effort** in writing the answer. This affects subjective components of assessment.

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Q.1) The STEM (Science, Technology, Engineering and Mathematics) sector provides opportunities for India to become a leader in knowledge economy; however, there is a need to democratise its access in order to harness its complete potential. Analyse. (10 marks, 150 words)

STEM (विज्ञान, प्रौद्योगिकी, इंजीनियरिंग और गणित) क्षेत्र भारत को ज्ञान अर्थव्यवस्था में अग्रणी बनने के अवसर प्रदान करता है, हालांकि, इसकी पूरी क्षमता का उपयोग करने के लिए इसकी पहुंच का लोकतंत्रीकरण करने की आवश्यकता है। विश्लेषण करें। (10 अंक, 150 शब्द)

"We are living in a science driven, innovation leader society where STEM occupies centre stage"
- NITI Aayog

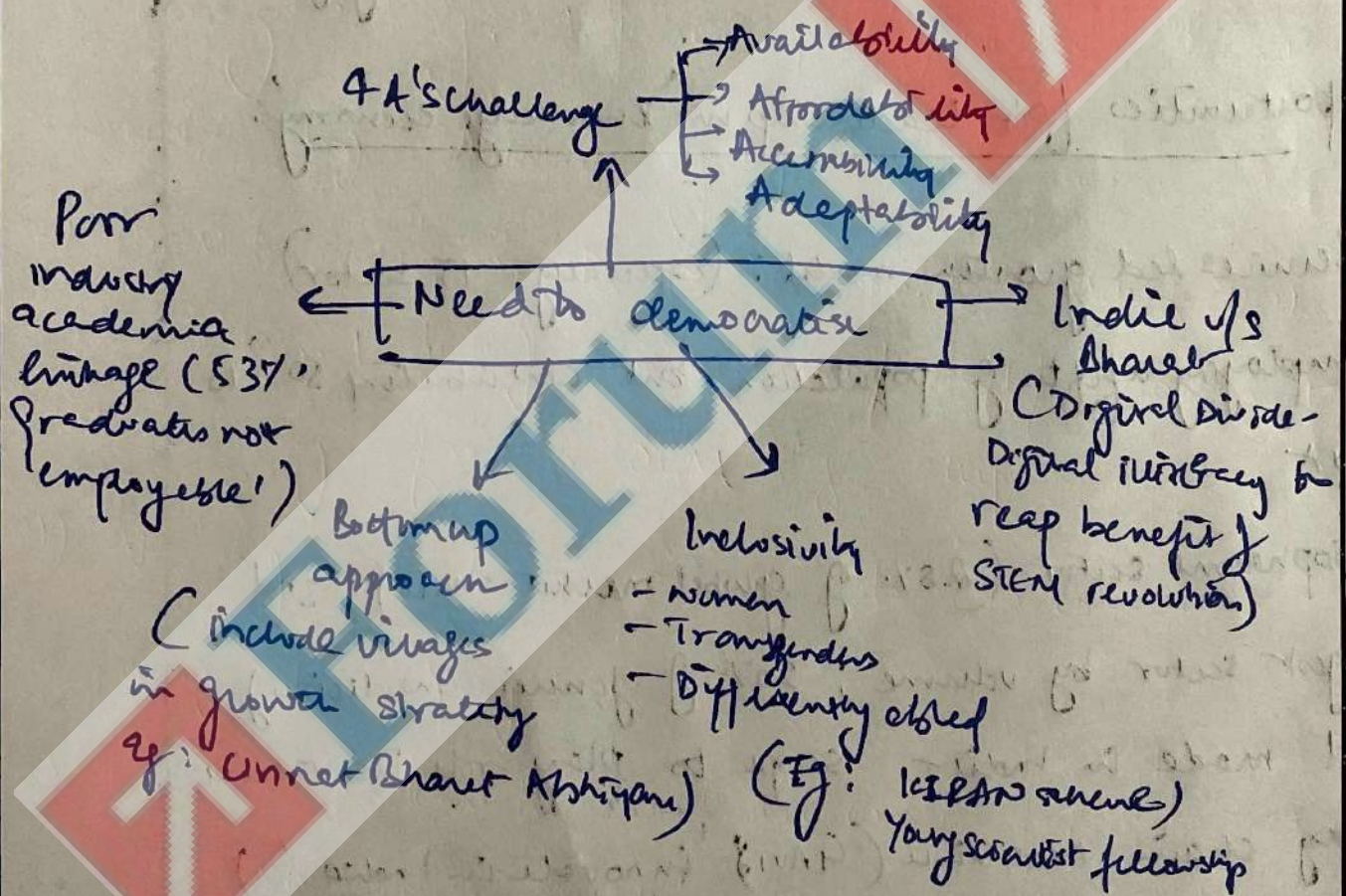
Opportunities for leadership in 'knowledge economy':

- 1) Services led growth model: (especially IT sector) employing a fifth of population but contributing 50% to GVA
- 2) Biopharm sector: (2.8% of global market share); 3rd largest sector by volume; 20% of generic medicines need made in India - scope to play role in vaccine supply chain resilience (GAVI) 'innovate in India'
- 3) Emerging technologies:
 - AI
 - 5G
 - Big Data
 - Machine Learning
 → scope to emerge as leader of global south
- 4) Soft diplomacy; linking STEM prowess with international

Relation - e.g. South Africa (GSA 08)

e-VBAs project for Africa (Telemedicine, Tele education)

- 1) Net security parallel - Quantum tech, supercomputing, maritime surveillance
- 2) Demographic bracket opportunity (till 2043) - young population (29 median age), high women population ratio, rich talent pool



Thus we need to promote R&D culture in STEM by enhancing public spending (0.7% GDP v/s China: 2.4%, EU: 2.3%, Israel: 4.0%)

Feedf (For OFFICE)

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Here G is Average
Poor.
TOTAL MARKS

Q.2) Defense indigenization remains the Achilles heel of India's security architecture. Examine the importance of startups in defense sector to make India secure and self-reliant.

(10 marks, 150 words)

रक्षा स्वदेशीकरण भारत की सुरक्षा संरचना का आधार बना हुआ है। भारत को सुरक्षित और आत्मनिर्भर बनाने के लिए रक्षा क्षेत्र में स्टार्टअप के महत्व को परीक्षण कीजिए।

(10 अंक, 150 शब्द)

India is largest defense importer and 3rd largest spender on defense, as per SIPRI report 2023.

In this context, defense indigenization is imp. because

- 1) Geostrategic vulnerabilities by being import dependent (Eg: China, Taiwan semiconductor tech dominance, USA)
- 2) Low negotiating power in international relations (Eg: NSG entry)
- 3) hurdle in acting as net security provider in Indo-Pacific

100% Indigenization:
A distant dream:

Extreme dependence on

- USA: GPS tech, Chinook

- Russia: Akula class INS chasers, Su-30 MKI, even for training

- Israel: Heron UAVs; MR-SAM.

Low teeth to tail ratio
indigenous defence expenditure
(Shekhar Committee)

Poor startup culture & defense spending

Importance of startups:

- 1) So that DRDO can focus on Sharp edge R&D & not routine manufacturing technologies (eg: role of private sector in USA's drone & guns manufacturing)
- 2) Tech saviness & better outcomes linked manufacturing : eg: 'Defense-space theatre' - recent launch by AgniKul startup.
- 3) (DDM (Indigenous Design, Development & Manufacture) - to avoid risk of surveillance / theft / encroachment measures by foreign OEM (eg: chips' spying)
- 4) Vision of Atmanirbhar Bharat → boost to local economy & employment
- 5) Better inclination to local needs (vs foreign imports that lack 'Indian touch' - eg: unique terrain of Indian borders require uniquely Indian Infrared tech & night vision cameras.
Defense Acquisition Procedure 2020 & IDEX are thus steps in right direction.

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TOTAL MARKS

Q.3) DPI (Digital Public Infrastructure) is indispensable for digitally enabling citizens and businesses; however, the challenges of exclusion, exploitation, and monopolisation cannot be ignored. Examine. (10 marks, 150 words)

DPI (डिजिटल पब्लिक इंफ्रास्ट्रक्चर) नागरिकों और व्यवसायों को डिजिटल रूप से सक्षम करने के लिए अपरिहार्य है हालाँकि, बहिष्कार, शोषण और एकाधिकार की चुनौतियों को नजरअंदाज नहीं किया जा सकता है। परीक्षण कीजिए।

(10 अंक, 150 शब्द)

With tele density of 93%, mobile penetration of 120 crore & push for Digital India, Digital Public Infrastructure has become need of the hour.

What: Interconnected, interoperable network of free/open digital hardware & software from Delhi to remotest village

Why/Significance:

- 1) Digital Governance: G2G, G2C, G2B, G2N modes of governance eg e-governance. Electronic delivery of services
- 2) Good Governance & Citizen-centric Governance (eg CSC network, UMANG App)
- 3) Seamless integration of social services - eg National Digital Stack - At Digital Mission
- 4) Revolutionary measures at eliminating corruption &

bringing in transparency - eg: JAM, UIDAI
 5) IRy.o, web 3.0 can be leveraged for benefits of
 Society 5.0 (eg: Indian Enterprise Architecture (INDIA)
 & National Digital Stack)

Challenges: A) Exclusion: 1) Digital divide:

18% are still multidimensionally poor with no
 access to resources

2) Poor fibreisation: only 32% tele towers connected
 with fibre network

3) no firm supply of power in rural India

B) Exploitation & Monopolisation:

4) Net neutrality norms are violated

5) Poor privacy regime

6) Lack of interoperability & process reengineering issues

7) Anti-competitive & restrictive practices - eg: Predatory
 pricing;

8) Dominance by oligarchs - Reliance / Bharti Group.

Thus there's urgent need of Policy framework
 (like that recommended by BN Srikishore Committee)
 along with regulatory regime to reap benefits of 'Amrit
 keel'

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TOTAL MARKS

Q.4) Project cheetah marks a departure from India's efforts for conservation of various critically-endangered species. In this perspective, do you think the reintroduction of major fauna that has gone extinct is justified? (10 marks, 150 words)

प्रोजेक्ट चीता विभिन्न गंभीर रूप से लुप्तप्राय प्रजातियों के संरक्षण के लिए भारत के प्रयासों से विचलन का प्रतीक है। इस परिप्रेक्ष्य में, क्या आपको लगता है कि विलुप्त हो चुके प्रमुख जीवों का पुनरुद्धार उचित है? (10 अंक, 150 शब्द)

India's commitment to preservation of wildlife is clear from constitutional mandate of Art 48A & fundamental duty under Art 51A.

In this context, Project cheetah was launched as a subset of Project Tiger to reintroduce African cheetah into Kuno-Namedehi Central Indian dry deciduous landscape long after it got extinct from subcontinent.

Conventional approach:

- 1) Focus on declining numbers of endemic species
- 2) Preserve keystone, umbrella CR species for ecosystem health (Eg. Hangul)

Project cheetah

Reintroduce already extinct species

Introduce a charismatic & keystone species that had lost relevance in India.

Key Concerns from reintroduction of extinct faunas:

- 1) Opportunity Cost - invest rather in species of relevance already declining → Great Indian Bustard, Snow leopard, ~~Amur~~ Red crowned turtle
- 2) Dangers of competition: eg. potential loss of prey to Tigers & lions in MP (chance limited success of Project cheetah)
- 3) May be accompanied by invasive alien species
- 4) Partial success, on introduction to new climate eg. death of cheetahs recently due to tropical infections

Justification: 1) Age old principles of respect for nature - measure to revive an old inhabitant (rather than 'exotic species')

- 2) May flourish the entire declining ecosystems eg. keystone role; role in biological succession
- 3) Soft power & Wildlife Diplomacy: (eg. India - members of S. Asian Pilehan).
India must weigh costs & benefits & take apt action accompanied with proper R&D.

Feedback

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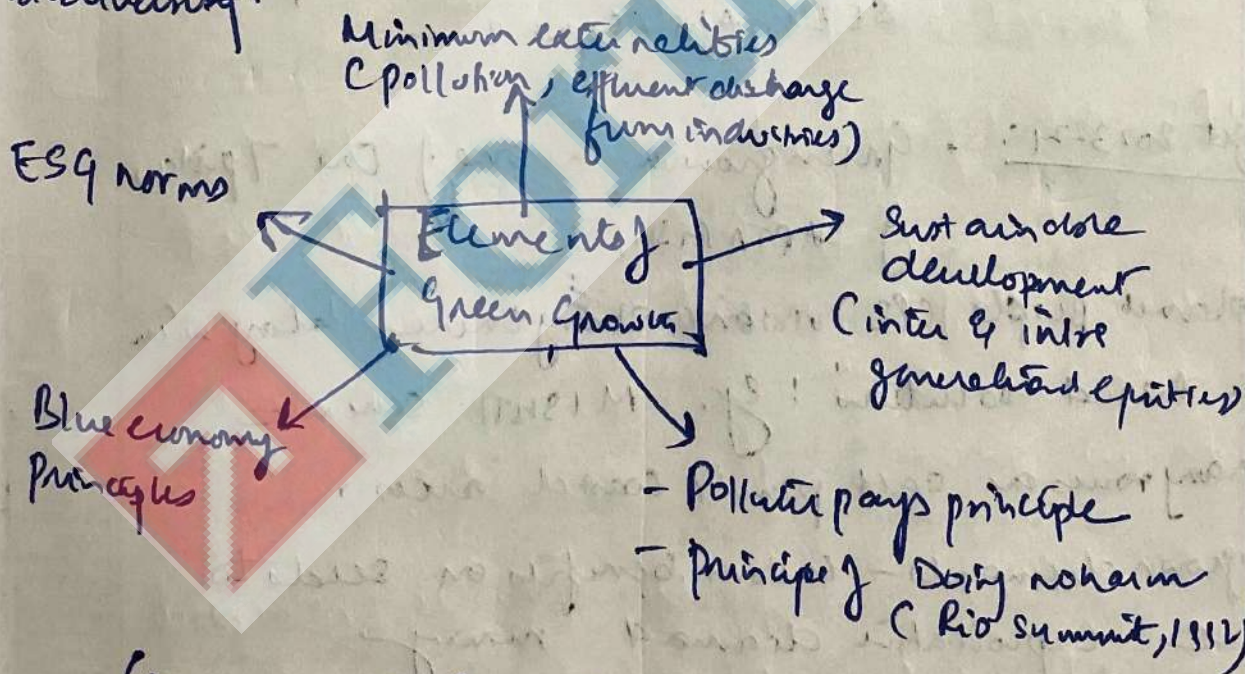
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TOTAL MARKS	

Q.5) What do you understand from Green growth? With special reference to the budget 2023-2024, discuss various government measures to propel green growth in the country.

(10 marks, 150 words)

हरित विकास से आप क्या समझते हैं? बजट 2023-2024 के विशेष रास्ते में देश में हरित विकास को बढ़ावा देने के लिए विभिन्न सरकारी उपायों का आकलन कीजिए। (10 अंक, 150 शब्द)

'Green growth' denotes symbiotic economic & ecological growth, with each interdependent on the other. It denotes development in standards of living in a way that carrying capacity of ecosystem is not breached & biogeochemical cycles are not disturbed; & there's no threat to biodiversity.



Government has embarked upon a mission mode approach to realize ailing green growth.

- 1) Renewables
 - National solar mission,
 - Wind-solar hybrid policy, offshore wind policy,
 - National Biofuel policy (Coop. Ethanol blends) by 2025
 - SATAT, PM-JIVAN
- 2) Lowering emissions
 - PAT scheme
 - E-saving certificates
 - Carbon Trading
 - NMECE
 - BS IV → BS VI norms
- 3) Corporate environmentalism
 - CSR
 - PSE norms
 - ESG norms
 - Green bonds
- 4) Building
 - GRIHA ratings
 - ECBC code
- 5) Blue economy
 - Matsya Sampade Yojna
 - OTEC plant @ Cochin deep
 - SEZs, Agri-export zones

Budget 2023-24: • Green growth is one of the 7 pillars of SAPTAARISHI

- No planet people (P3) vision, strengthened along with nature based solutions: e.g. MISHTI scheme for mangroves on salt pans & coastal areas.
- Help grow diamonds - custom benefits on seeds to reduce exploitative diamond mining
- Boost to Paramparagat kheti vinas yojna (organic farming)

This Budget 2023 is the road to vision of New India @ 2047

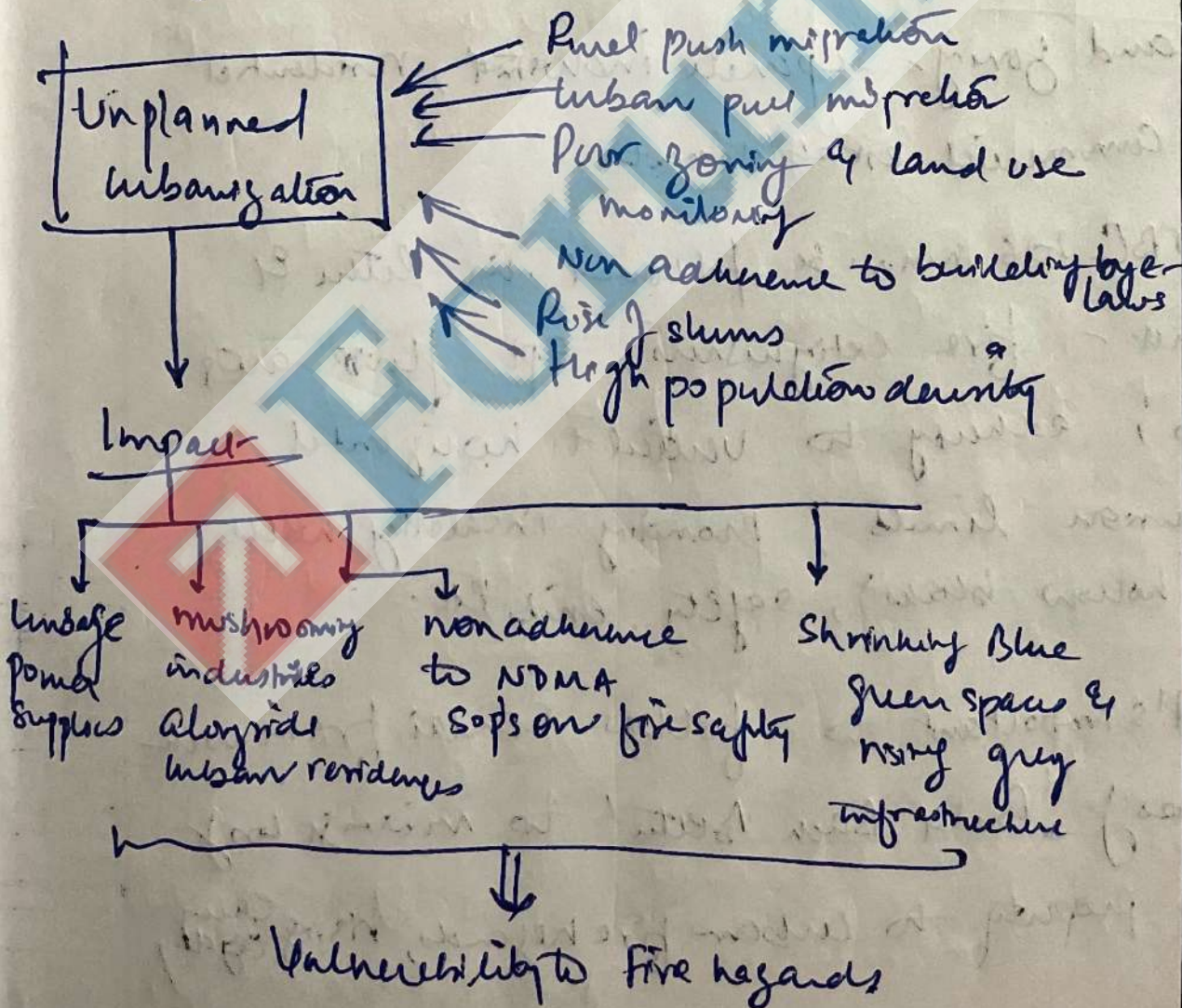
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Q.6) Unplanned urbanization has made Indian cities vulnerable to fire safety hazards. Discuss and recommend measures for mitigating urban fires, with special reference to national building code, 2016. (10 marks, 150 words)

अनियोजित शहरीकरण ने भारतीय शहरों को अग्नि सुरक्षा खतरों के प्रति संवेदनशील बना दिया है। राष्ट्रीय भवन संहिता, 2016 के विशेष संदर्भ में, शहरी अग्नि को कम करने के उपायों पर चर्चा करें और सुझाव दीजिए। (10 अंक, 150 शब्द)

As per UN Habitat's world cities' report, 60% of Indians will live in cities by 2050. Currently 34% of Indians live in urban areas & cities are already non-linear & prone to natural & anthropogenic hazards like fires.



Measures for mitigation:

- 1) Hazard Risk Vulnerability Assessment of urban spaces to take remedial measures
- 2) SOP awareness (eg: sand buckets for fire extinguishers); Incident response system & take punitive measures against violative establishments
- 3) Land zoning - separate industrial, residential & commercial establishments
- 4) NBC 2016 norms be followed in letter & spirit - fire extinguishers, apt floor area ratio, adhesion to vertical & horizontal expansion limits; promoting insulating walls (eg. hollow blocks), safety exits etc.

It's important to follow Sendai framework principles 'Build Back Better' to minimize long lives, property to urban fire hazards, rising ^{every} day

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Q.7) Edge in modern warfare lies not so much in the capacity to overwhelm the adversary as much in the ability to nip the threat in the bud. In this context, discuss the role of intelligence in maintaining national security, and also cite challenges associated. (10 marks, 150 words)

आधुनिक युद्ध में बढ़त प्रतिद्वंद्वी पर हावी होने की क्षमता में उतनी नहीं है जितनी कि खतरे को शुरुआत में ही खत्म करने की क्षमता में है। इस संदर्भ में, राष्ट्रीय सुरक्षा को बनाए रखने में खुफिया जानकारी की भूमिका पर चर्चा कीजिए और इससे जुड़ी चुनौतियों का भी उल्लेख कीजिए। (10 अंक, 150 शब्द)

While soldiers of armed forces displayed remarkable dedication during Indo-Chinese war of 1962, Kargil proxy war of 1999 & recent Galwan skirmishes (2020+), intelligence failure during these events meant that we lost initial edge.

Conventional approach to warfare -

- * Based on Cold start - unbearable damage to enemy post first strike
- * Limitations - modern technologies - already massive damage could have been done (e.g. nuclear missile possessed by 2 of our northern neighbours - Pakistan & China)

Modern warfare, modern techniques, modern solutions

- * Need to recalibrate our tactical warfare doctrine.

- * Intelligence enables 'beginners' advantage' to neutralize threat even before it arises.
- * Gives time to mobilize forces, if needed. Eg. Pakistan of speedy mobilization witnessed during Operation Prabhakr (2001 parliament attacks).
- * Can launch counter-offensive & preemptive strikes, if needed. (Eg: against Bioterrorism)

Challenges: 1) Agencies' jurisdictional overlap

mushrooming of intelligence agencies with not so clear roles/goals - eg. Special Frontier Force vs Intelligence Bureau

2) Newer technologies used by non state actors -

'Dark web', satellite communication;

3) Language barrier pointed by ORF (eg. our IB officials deployed in other nations)

4) Countering internal traitors/informers @ present

Thus, we need to promote interagency cooperation & provide them with necessary terminological support

Feed
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Q.8) Highlighting different kinds of cyberthreats faced by India, evaluate the current status of cybersecurity framework in the country. (10 marks, 150 words)

भारत द्वारा सामना किए जाने वाले विभिन्न प्रकार के साइबर खतरों पर प्रकाश डालते हुए, देश में साइबर सुरक्षा ढांचे की वर्तमान स्थिति का मूल्यांकन करें। (10 अंक, 150 शब्द)

MIT's Cyber defense Index ranks India 17th out of 20 emerging economies (2023), thus highlighting our vulnerabilities & suboptimal preparedness to cyber threats.

Kinds of cyber threats

- 1) Phishing & vishing: ~~of~~ breach of privacy over say voice call
- 2) Spoofing & snooping: Compromised e-mails
- 3) Bots & Malwares - malicious softwares that affect the system
- 4) Ransomwares - Eg. Lockbit
- 5) Distributed Denial of Service attack
- 6) Trojan horses
- 7) Cyber warfare & cyber terrorism (other states / non state actors involved)
Eg: STUXNET
- 8) Infected apps & softwares; (Eg. Pegasus)

Current status of cyber security framework:

A) Legislative:

1) IT Act 2008 = 41 sec 70: talk about
enables protection of critical information
infrastructure

2) National Cyber Security Policy 2013 - states
strong cyber workforce

3) NCS strategy 2020 - updated security paradigm

B) Executive:

4) Cyber Swachhata Kendras - Botnet/malware
clearing centres

5) Cyber Swachhata Bharat Initiative

6) Cyber Hackathon to invite private sector

C) Other agencies/organizational structure

7) ISCIIC 8) CERT IN (CERT-Fin (Finance))

9) NCCC

10) CERT-DW (Cyber)

D) International measures: Tallinn manual.

India can think of joining Budapest Convention
to learn from the best.

Feed!
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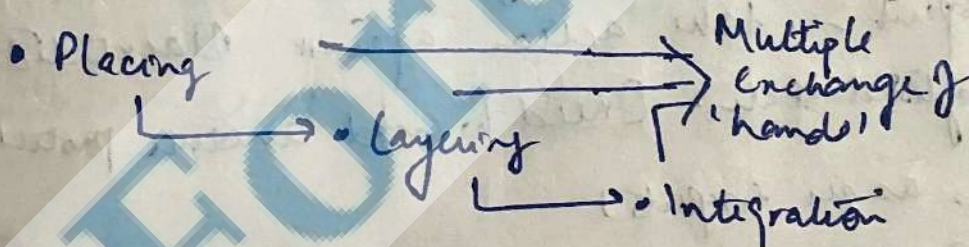
Q.9) Money laundering is a global problem that cannot be solved by isolated responses. Discuss the statement and also suggest ways to curb the menace. (10 marks, 150 words)

मनी लॉन्ड्रिंग एक वैश्विक समस्या है जिसे विभाजित प्रतिक्रियाओं से हल नहीं किया जा सकता है। कथन पर चर्चा करें और खतरे को रोकने के तरीके भी सुझाए। (10 अंक, 150 शब्द)

Money laundering involves 'legitimizing' the proceeds of crime or unaccounted, illegal income from any source.

Global problem that can't be solved by isolated responses:

1) Because it's a 3 stage process with multiple actors involved:



2) Nature of international transaction & involvement of organized criminals:

eg: Hawala transaction; Dark web (The Onion Ring / TOR)

3) Tax havens often become sources of black money because they attract shell companies

& other organizations that resort to Round Tripping, Tax evasion, Profits shifting

4) State sponsored terrorism & associated networks acts as a future challenge to curb 'Sovereign' nature of ML.

Ways to curb:

- 1) International cooperation - Intelligence sharing & constant surveillance - Eg: ECOMINT group of financial intelligence units
 - 2) 40 + 9 recommendations of FATF be followed in spirit - take action against blacklisted & greylisted states. (Need to add another protective layer, as per experts)
 - 3) Global Anti avoidance rules (Paris authority sponsored recommendations), curb shell companies &
 - 4) OECD roadmap for BEPS.
 - 5) Realtime sharing of "Suspicious Transaction Reports" by financial regulators.
 - 6) Prompt implementation of PMLA 2002 & 2005 rules.
- These steps are aimed to map PMLA in the land.

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Q.10) Assess the relevance of the NISAR mission in observing and managing climate change and natural hazards. (10 marks, 150 words)

जलवायु परिवर्तन और प्राकृतिक खतरों के अवलोकन और प्रबंधन में NISAR मिशन की प्रासंगिकता का आकलन कीजिए। (10 अंक, 150 शब्द)

Nasa-Isro Synthetic Aperture Radar is yet another Indo-US collaboration in the field of space science to leverage space technologies for better ecological monitoring and enhancing standards of living.

- 1) Can work in dual L-band & S-band frequencies - ~~ex~~ and will enable large resolution mapping of topography & atmosphere
- 2) Special focus on monitoring of cryosphere / ice caps → will enable monitoring movement of glacial masses & their retreat.
- 3) Real time atmospheric / hydromet data to study cloud-aerosol-albedo feedback say, over Tibetan plateau

4) Will enable in building Early warning systems for "Avalanches, Glacial outburst floods (e.g. Chovabari 9/10/2013)

5) 'Night vision' and reconnaissance data will help analyze effect of 'radiative forcing' of greenhouse gases

Thus NSAR can act as a tool for not just Indo-US space diplomacy, but a tool to take action against triple challenge of pollution, climate change & biodiversity loss.

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Q.11) Though often presented as a panacea to the dichotomy between development and ecological conservation, nuclear technology has multitude of other uses. Briefly explaining India's three stage nuclear program, throw light upon various applications and challenges associated with nuclear technology in the country. (15 marks, 250 words)

हालांकि अक्सर विकास और पारिस्थितिक संरक्षण के बीच द्विभाजन के लिए परमाणु प्रौद्योगिकी को रामबाण के रूप में प्रस्तुत किया जाता है परंतु इसके कई अन्य उपयोग भी हैं। भारत के तीन चरणों वाले परमाणु कार्यक्रम की संक्षेप में व्याख्या करते हुए, देश में परमाणु प्रौद्योगिकी से जुड़े विभिन्न अनुप्रयोगों और चुनौतियों पर प्रकाश डालिए। (15 अंक, 250 शब्द)

Nuclear technology accounts for 1.6% share in India's energy basket (installed power capacity).

Applications: (A) Panacea to economy-ecology rift

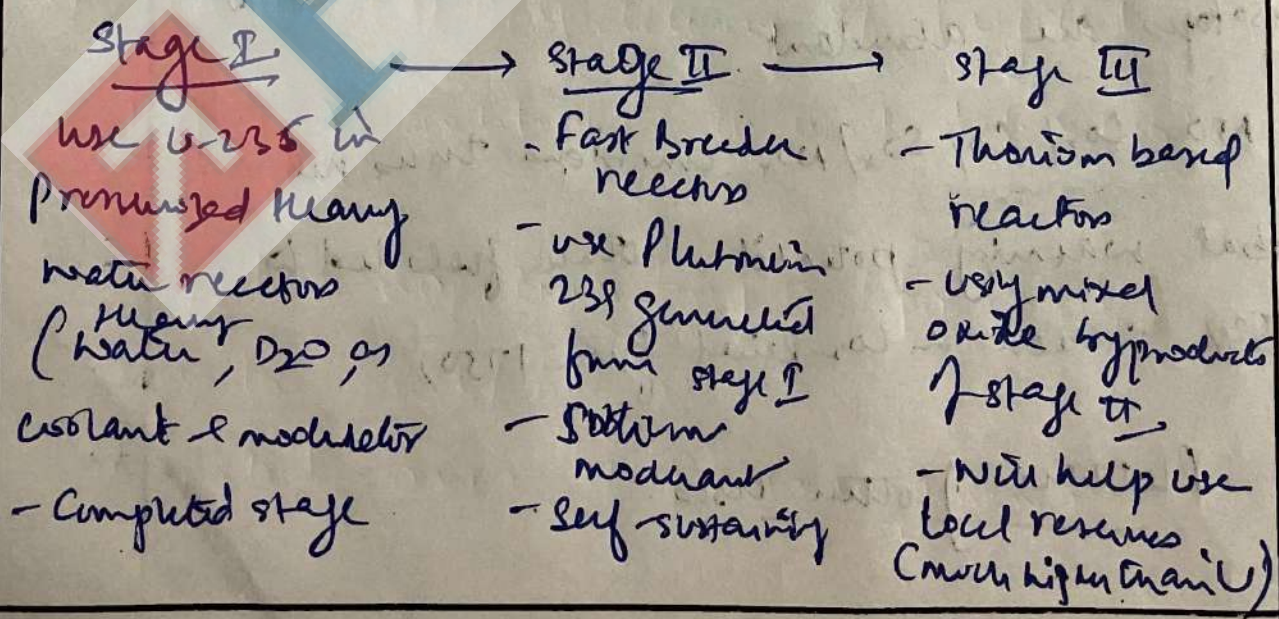
- 1) Not a fossil fuel based non-renewable technology → thus no fear of running out of it like coal / petroleum
- 2) Practically unlimited source of energy, especially if nuclear fusion becomes feasible, as hydrogen isotopes are abundant

3) NO CO₂/CO/SO_x/NO_x emissions thus nil global warming potential. (Other fuels led to 153% increase in CO₂ level from 1750)

(B) Plethora of other uses:

- 4) Chemoradiation therapy for treatment of cancer / tumors.
- 5) Food irradiation facilities - (currently 35). food gets lost to decay losses in ~~and~~ supply chain) eg. laser gun, waste facilities.
- 6) International Relations: EU's objections to Alpha mango / food products of sanitary-phytosanitary measures can be addressed.
- 7) Seismic-geophysical investigations to obscure mode of earth.

3 stage nuclear programme Band on Closed cycle approach.
(Kamraj Bhabha's vision)



- Challenges:
- 1) Nascent stage of technology - Eg: seen in stage II of Nuclear prog.
 - 2) Issues of Liability or Damage (Eg: Chernobyl / Fukushima) remain suboptimally addressed, despite dedicated Act for the same.
 - 3) Poor nuclear waste disposal regime, though the IAEA is heavily on vitrification technology.
 - 4) Potential misuse by non state actors - Eg: of fissile material.
 - 5) Discharge of water remains contentious (Eg: D2O discharge in East Pacific & protests in Japan)
 - 6) International bans - NSG & NPT, 1968.
- Thus, it's important to balance costs & benefits of environment a well designed stage for nuclear technology is in 3rd largest energy consumer of the world (IEA)

Feedback

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Q.12) What do you understand by nanotechnology? In what ways can nano-technology aid in socio-economic growth of the country? (15 marks, 250 words)

नैनो टेक्नोलॉजी से आप क्या समझते हैं? नैनो-प्रौद्योगिकी देश के सामाजिक-आर्थिक विकास में किस प्रकार सहायता कर सकती है? (15 अंक, 250 शब्द)

Nanotechnology is the science of particles of size 1nm - 100nm and the corresponding applications due to altered physical, optical, electric & surface properties of the materials.

Indian regime

- Inception in 9th Plan
- National Nano Mission, 2007
- National IT Strategy & Mission on Nanoelectronics

Role in socio-economic growth:

- A) HEALTH
- 1) Drug delivery & targeted response of antibiotics to avoid antimicrobial resistance
 - 2) Gold nanoparticle being used for finding cure to cancer / tumors.
 - 3) Spatial omics & pharmacogenomics

B) AGRICULTURE:
 u) Nano urea (uree gold)
 for nitrogen use efficiency of 85-90% (v/s conven
 tional urea: 25%)

5) Nano sprays of pesticides - low leaching
 low contamination
 of ground

6) Nanosensors to monitor soil health & moisture

C) DEFENSE:

7) Nano spies, surveillance for national
 security.

8) Nanobots combining robotics & nanotechnology

D) INDUSTRY:

9) Nanotech based self cleaning toilets

10) Nanotech based carbon nanotubes - one of
 the lightest materials known to mankind

11) Silver nanoparticles for sterile socks.

E) ENVIRONMENT:

12) To control oil spills (eg Bioremediation
 via Oilivorus-S & oilzapper developed by

Topic

13) Water purification osmosis of sea water for water use in remote islands & areas of salinity ingress.

14) Remedy soil toxicity near affected aquifers (eg: Cadmium contamination)

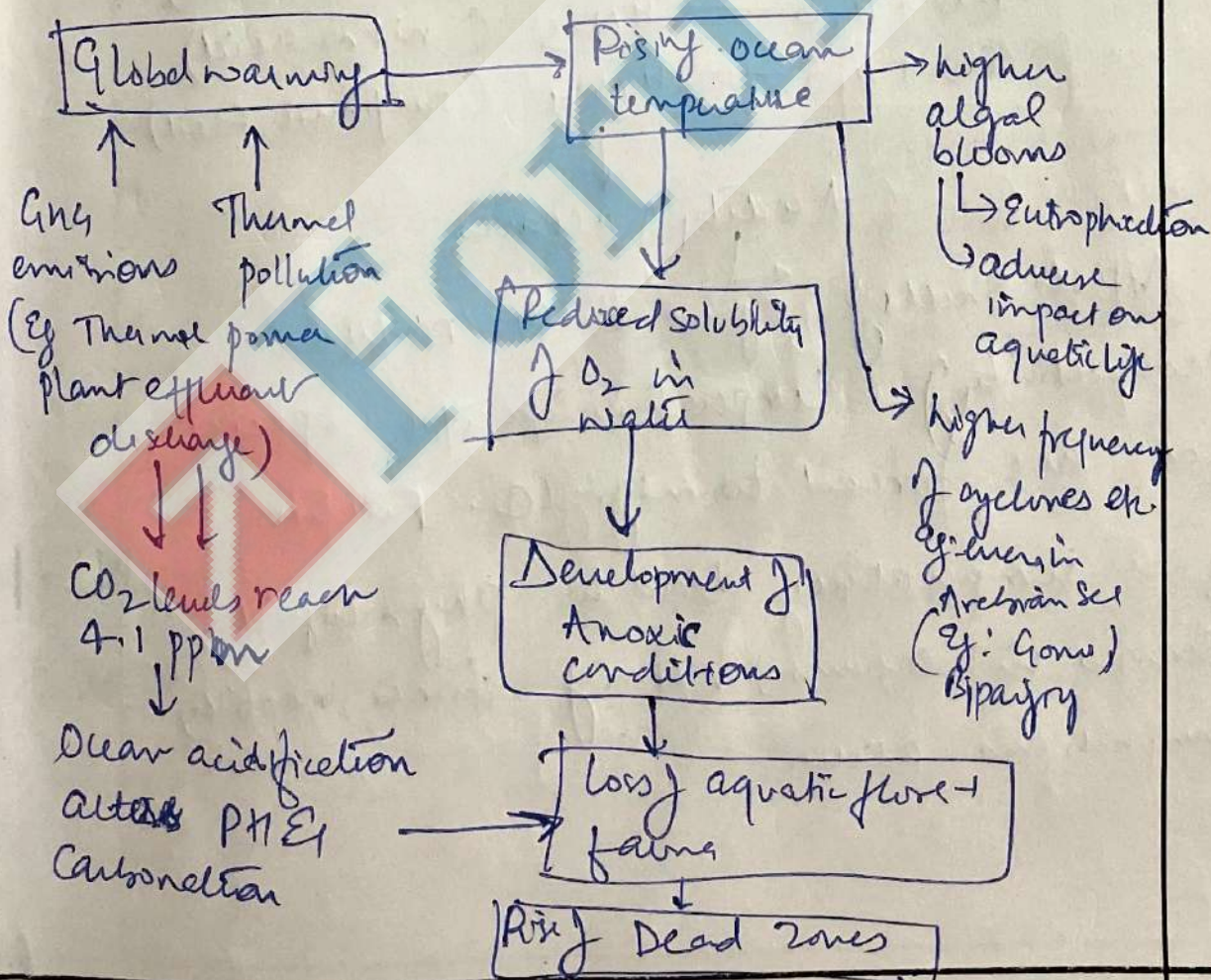
This nanotech can contribute to around 50 bn USD to Indian economy by 2025 & can aid in meeting demand of 5 bn \$ economy by 2025.

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Q.13) Warming ocean temperatures, oxygen loss and ocean acidification form a deadly trio for marine ecosystem that can have irreversible repercussions for environment as well as economy. Elucidate. (15 marks, 250 words)

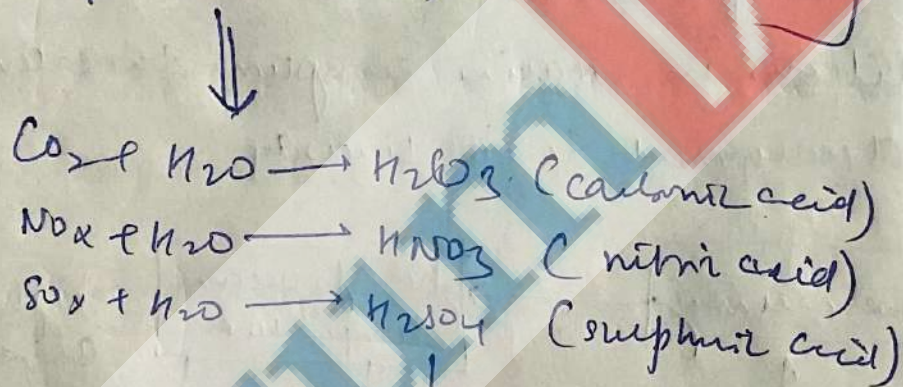
समुद्र का गर्म होना, ऑक्सीजन की कमी और समुद्र का अम्लीकरण समुद्री पारिस्थितिकी तंत्र के लिए एक घातक तिकड़ी है जो पर्यावरण के साथ-साथ अर्थव्यवस्था के लिए अपरिवर्तनीय प्रभाव डाल सकती है। स्पष्ट करें। (15 अंक, 250 शब्द)

Marine ecosystem is intricately linked to our lifestyle & growth story. But sea levels rising by 7mm per year, temperature of 1.3° above preindustrial levels and anoxic conditions in marine ecosystems threaten our development & biodiversity.



These changes) undesirable consequences have more to do with anthropogenic activities rather than natural cycles.

- High vehicular emissions \rightarrow CO , NO_x , PM
- Chimney gaseous pollution \rightarrow CO_2 , CO , SO_x , NO_x
- Thermal plants \rightarrow CO_2 , SO_x



↓
Acidity of oceans

Affects shells of oysters etc & reduce productivity of temperature specific species that are forced to migrate. Further higher temperatures lead to physiological stresses in oceans, harming fishes, reptiles, amphibians etc.

Impact on economy

- 1) Cont. harms potential of Blue economy because fish yield decreases
- 2) Altered mineralogy of sea floor \rightarrow degradation of polymetallic nodules etc.
- 3) Coral bleaching + death \rightarrow loss of ^{tourism} ~~tourism~~ ^{tourism} ecosystem
- 4) Disasters increase (many of them get destroyed) $\left\{ \begin{array}{l} \text{tidal surge} \\ \text{cyclones} \\ \text{tsunami} \end{array} \right. \rightarrow$ loss of life, property & employment along coast
- 5) Infrastructure along coasts affected - eg: alcohol offshoot recession of concrete buildings, corrosion of steel bars, salinity in iron affects coastal farms

Thus, there is a need for eclectic approach under ambit of UN Decade on Ocean Sustainability to realize aim of SDG 9, 13 and 14.

Feedback

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Q.14) Examine the factors that heightens the vulnerability of Indian cities to urban floods. In light of National Disaster Management Authority (NDMA) guidelines on urban floods, discuss suitable mitigation and management strategy. (15 marks, 250 words)

उन कारकों का परीक्षण कीजिए जो शहरी बाढ़ के प्रति भारतीय शहरों की सुभेद्यता को बढ़ाते हैं। शहरी बाढ़ पर राष्ट्रीय आपदा प्रबंधन प्राधिकरण (NDMA) के दिशा-निर्देशों के अलोक में उपयुक्त शमन और प्रबंधन रणनीति पर चर्चा करें। (15 अंक, 250 शब्द)

As per NDMA, 12.5% of Indian area is prone to floods. But urban India is particularly vulnerable to this disaster. Kerala, Chennai, Bangalore floods over last 8 years show that urban floods are not as natural as man-made disasters.

Vulnerabilities of cities:

A) NATURAL

1) Tropical nature of subcontinent & monsoon type climate: 120cm annual rainfall:

70% in 4 months only (June-Aug)

2) Basin topography → water logging (eg: NE Indian cities)

3) Storm surges, shifting courses of rivers (in north India)

~~4)~~

- 5) Anthropogenic :
- 4) High population density & poor land zoning practices - eg. rise of slums on Yamuna flood plains in Delhi.
 - 5) Choked, unclean drains → increase peak and volume of floods as ^{runoff} water gets no easy passage to sea.
 - 6) Poor management of water reservoirs/dams eg. Mullaperiyar mismanagement attributed to Kerala floods.
 - 7) Replacement of blue green spaces by grey infrastructure -
 - 8) Disappearance of wetlands that acted as buffers.
 - 9) Concrete jungles → urban heat island → heat domes → severe floods.
 - 10) Poor risk mapping & disaster risk governance

Mitigation cum management strategy
(in light of NMA guidelines)

- 1) High Hazard Risk - Vulnerability mapping to take priority based action

- 1) Prohibit settlements in high risk zones
- 2) Frequent cleaning of drains (Agartala model)
- 3) Early warning system & coordinated communication
(Eg: Mumbai: flows app; Chennai: Chowr app)
- 4) Sponge cities approach - wetland network & blue spaces; porous / pervious surfaces
- 5) Rainwater harvesting, revive traditional water harvesting structures + Tanks + Qanats + Ahar pyne + Bawdis
- 6) Color coding of warnings for preparedness → use AI, big data tools for weather forecasting
- 7) Dams rehabilitation (Eg: Dred. project funded by WB) + repair

These steps are imperative to realize the vision of Hyogo framework Action & Sendai Framework

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Q.15) Though Naxalism is showing a downward trend, it is not only thriving in its core areas of influence but also changing its form. Analysing the reason for its retreat, underline the factors behind its continuance. Also, discuss measures towards eliminating LWE from the country altogether. (15 marks, 250 words)

हालांकि नक्सलवाद में गिरावट की प्रवृत्ति दिख रही है, लेकिन यह न केवल अपने प्रभाव के मूल क्षेत्रों में फल-फूल रहा है बल्कि अपना रूप भी बदल रहा है। इसके पीछे हटने के कारणों का विश्लेषण करते हुए, इसके जारी रहने के पीछे के कारणों को रेखांकित करें। साथ ही देश से वामपंथी उग्रवाद को पूरी तरह खत्म करने के उपायों पर भी चर्चा करें। (15 अंक, 250 शब्द)

Motion Affairs data shows a 74% decline in left wing extremism related violence incidents since 2010. While in absolute terms, area of 'Red Corridor' has shrunk, it has developed its appendages into hitherto unaffected areas like Kerala - Tamil Nadu-Karnataka border.

Reasons for its retreat:

- 1) Cauter stick policy of govt: violence responded with strict action, but Rehabilitation policy for those willing to give up arms.
- 2) Security related expenditure scheme - State reprimanded for anti naxal measures.
- 3) Reducing support of locals poor social sector schemes e.g. Shiksha (war Roshni), Infra

• Structure development (PM Gram Sadak Yojna)

4) Coherent action by states

* ^{Bastar} COBRA Battalion - Chhelofgarh

* Grey hounds - Andhra

* Operation Anarode - Jharkhand

* Centre's support of Operation Green Hunt

* Maharashtra police - Gadchiroli encounter

5) SAMADHAN Doctrine of govt. : Dashboard based
KPI's, actionable intelligence

Factors behind continuance:

1) Overground workers: + Urban terrorism -
new support groups of 'sympathisers' of rebels
that help them materially + financially +
ideologically.

2) Foreign angle → Coordination committee
(Philippines - China - Japan)
- Myanmar

3) Ideological support: Maoist Philosophy
propagation - vision of equal society /
arms infiltration via Nepal

- 4) Asymmetric warfare - Guerrilla tactics; IEDs.
 - 5) Using children as 'bombs' - Bal Dastar.
 - 6) Failure of actionless intelligence
- Elimination measures:
- 1) Choke funding to Naxals - internal & external
 - 2) Area based approach - confinement strategy
 - 3) Development measures to reduce entitlement by Naxals - eg. Balimela reservoir → Gumpriya bridge
 - 4) Leverage media - eg. Bultoo video by Chhatisgarh
 - 5) Tackle threat of urban Naxals by strict punitive measures
 - 6) Leverage technology - eg. DAKSH Drone to identify IEDs.

The Naxalism can be eliminated only by denying the promise of 'democracy' & 'development'

Feedback

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Q.16) Across sectors and regions, the most marginalised sections are also the most affected by the impacts of climate change. Explain. Also, present a case for a climate resilient model of development that integrates mitigation and adaptation measures.

(15 marks, 250 words)

विभिन्न खंडों और क्षेत्रों में, सबसे अधिक हाशिए पर रहने वाले वर्ग भी जलवायु परिवर्तन के प्रभावों से सबसे अधिक प्रभावित हैं। व्याख्या कीजिए। इसके अलावा, विकास के जलवायु लचीले मॉडल के लिए एक मामला प्रस्तुत कीजिए जो शमन और अनुकूलन उपायों को एकीकृत करता है।

(15 अंक, 250 शब्द)

Climate change is not a distant danger, but a deplorable reality and an unequal war that affects different groups differently.

As per UNDRP, more than half of total refugees are climate refugees in 2023.

Marginalised sections

Low access to resources

Eg: women: more than 50% of all climate refugees

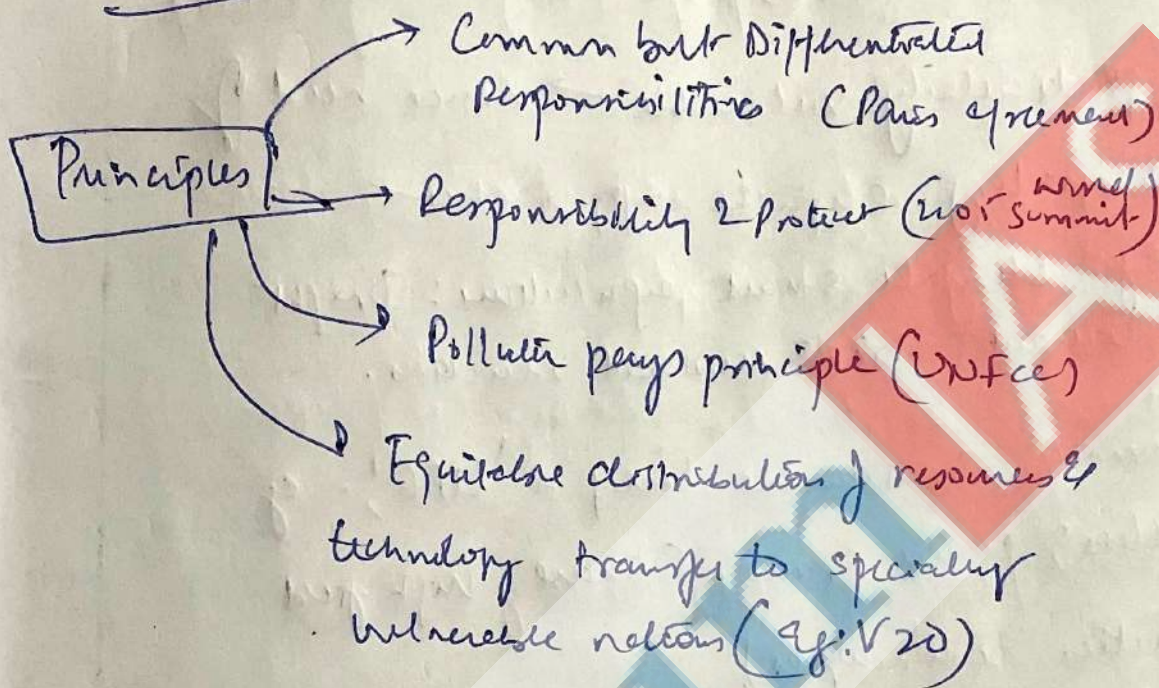
* other vulnerable:

children, differently abled - can't swim
(Eg: Cox Bazar cyclone study)

Low capacity
& poor adaptability

Disproportionate impact of climate change, extreme weather events & natural disasters

Case for climate resilient model of development:



* Equal emphasis on adaptation + mitigation unlike current global stage that values mitigation more

* Proportional mitigation/adaptation fund contribution - Eg. half of funds should come from USA, China, EU, given their historic emissions → invest in climate resilience

Small Island & other nations:

- Coastal shelter belts
- Nature based solutions (Clouds from Initiative)

• Mangroves - as sentinels of coast

* Tribals / indigenous people / coastal communities are particularly vulnerable → hence need of participatory climate approaches -

eg - Climate smart agriculture Drought tolerant Datura mustard varieties.

* Promote sustainable living & 'UPF', - eg millets; coarse grains, (share high yield varieties technologies),

Thus, Act 2, Art 4.18 & Art 6.1, 6.2 of Paris Climate Deal must be implemented in spirit & INDCs of all nations must be encouraged to be revised upwards to launch \$100bn USD fund for climate resilient & vulnerable.

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Q.17) A multi-sectoral and multi-tiered process, Disaster Risk Reduction (DRR) is beset with a plethora of constraints. Identifying these constraints, recommend measures for building a robust DRR strategy. (15 marks, 250 words)

एक बहु-क्षेत्रीय और बहु-स्तरीय प्रक्रिया, आपदा जोखिम न्यूनीकरण (डीआरआर) कई बाधाओं से घिरी हुई है। इन बाधाओं की पहचान करते हुए, एक गजबूत डीआरआर रणनीति बनाने के उपायों की सिफारिश कीजिए। (15 अंक, 250 शब्द)

1) 'Disaster Risk Reduction' is a wholesome strategy of 1) understanding disaster risk, 2) improving disaster governance; 3) enhancing capabilities and resilience & 4) being prepared for any calamity, by realizing the principle of 'Build-Back-Better'.
— Sender Framework of Acta (2015-30)

Constraints:

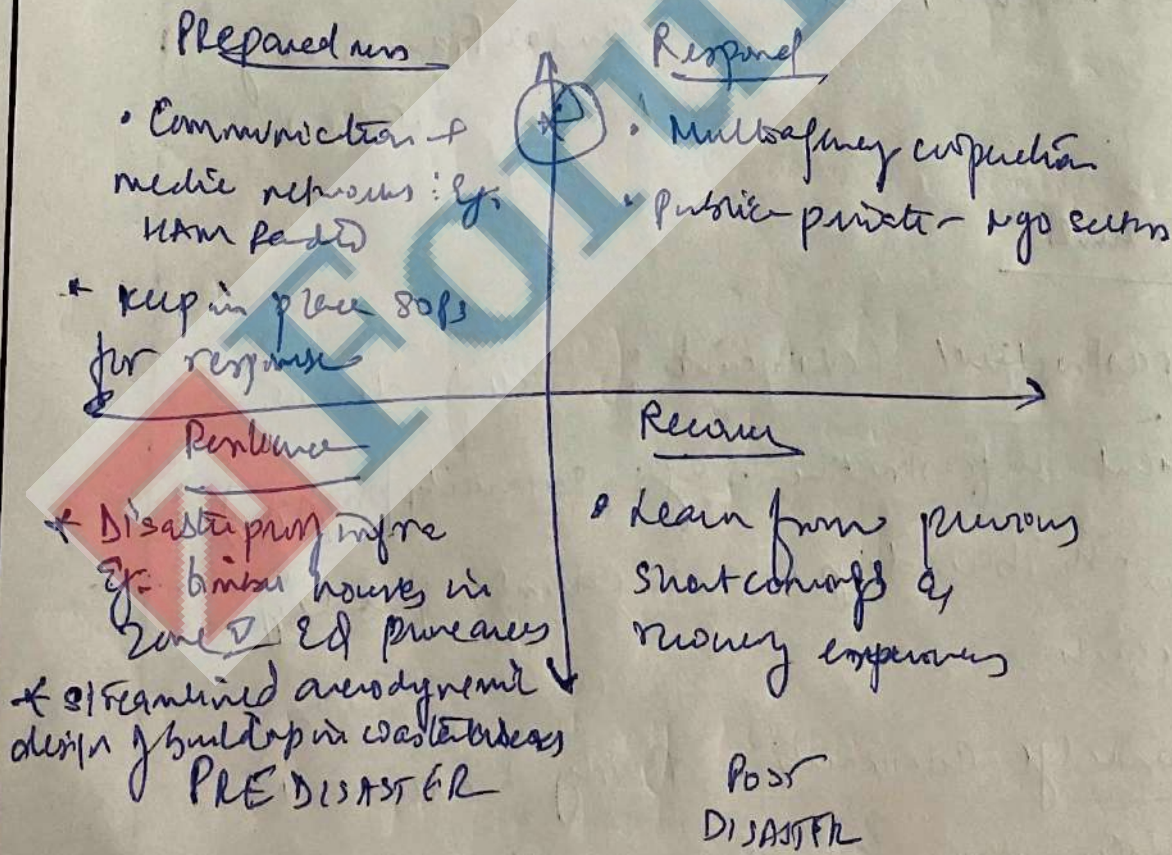
1) Infrastructure constraints: Lack of disaster resilient infrastructure - eg: seismicity/pronging of high rise buildings, - becoming funding constraints

2) Knowledge constraints: Poorly understood disaster risks, especially erratic nature of

Disasters in era of climate change

- 3) Practical constraints - lack of early warning systems
- 4) No community participation! Top down approach of 'centrality'
- 5) North-south divide in ~~copy~~ copy capacities

Measures for robust DRR strategy:



Robust DR strategy would be based on
PM's 10 point agenda of including women in
risk reduction, involving local (best aware of
constraints & local resources) & developing area
EWs (by INCOS EWS for Tsunami).

Feedback

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Q.18) Though ethnic fault lines are a major threat, security challenges in the North-East are not confined to the same. Discuss the statement with special reference to Manipur. (15 marks, 250 words)

यद्यपि एथनिक फाल्ट लाइन्स (नृजातीय त्रुटिपूर्ण रेखाएँ) एक बड़ा खतरा हैं, उत्तर-पूर्व में सुरक्षा चुनौतियाँ यहीं तक सीमित नहीं हैं। मणिपुर के विशेष संदर्भ में कथन पर चर्चा कीजिए। (15 अंक, 250 शब्द)

North East has emerged as hotspot of insurgency, partly because of its ideological balkenization and partly because of geographical the region.

1) Ethnic fault lines: numerous tribal & ethnic identities view perceive each other as threats and hindrances to development

eg- Nagas alone consist of

- Aozamti
- Ao
- Kachari
- Chang etc

Manipur ethnicity:

valley: dominated by Meiteis
hills: Nagas, Kachis, Zoms

- 2) History: 1980's saw violent tussles between Khasi & Jaintia. Now newer frontlines have emerged
- 1) Security focus & perception: - Mers feel discriminated by Assam Rifles & Khasi by Manipuri Rifles.
- 4) Drug link & Naxal insurgency: - linkages with organised crime: Manipur emerged as western end of 'Golden Triangle' - opium hotspot of the world. Proceeds used to fund insurgency
- 5) Ethereal angle: refuge to insurgents in certain areas of Manipur eg. NSCN-IM, Khasi'
- 6) Issues of IIT regime - 16 km access roads on either side of border - misused by certain groups to smuggle arms, ammunition, food & even ^{transport of} insurgents
- 7) APLA opposition - perceived as 'anti-tibet' measure rather than security measure, breeding

Trust deficit between government & governed

8) Corruption in local elite; Unequal distribution of resources - more are with less populous and less socio economically developed & less politically represented (tribes)

9) Demands of ministers to add (minerals etc) as a privilege under Art 371C

Thus we need to review ^{& review} Suspension of Operations Agreements with NULCs & Zones & promote

Anti Action Programme with both sides to along with implementing CIBMS along International borders to ensure peace in the region.

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Q.19) Critically examine the role of development initiatives in addressing the root causes of militancy/ terrorism in Jammu & Kashmir. (15 marks, 250 words)

जम्मू और कश्मीर में उग्रवाद/आतंकवाद के मूल कारणों को संबोधित करने में विकासात्मक पहल की भूमिका का आलाचिन्तात्मक परीक्षण कीजिए। (15 अंक, 250 शब्द)

Recent rise of insurgency in Poonch & Rajouri regions of Kashmir demands a reanalysis of our approach towards J&K

Role of development initiatives:

- 1) Bridging the trust deficit between people & Government (Vienna Convention, 2007)
- 2) Delivering the promise of Instrument of Accession signed with Kashmir @ independence - treating it as integral part of India like any other state
BT
- 3) Addressing the skill gap & demographic gap (socio-economic indicators), e.g. Boshni, Minayetscheno
- 4) Defuse infrastructure to counter infiltrations & incursions - e.g. Daulet Beg deli road,

Chenels bridge

1) Tourism to boost local economy → else desperate
youth take desperate actions

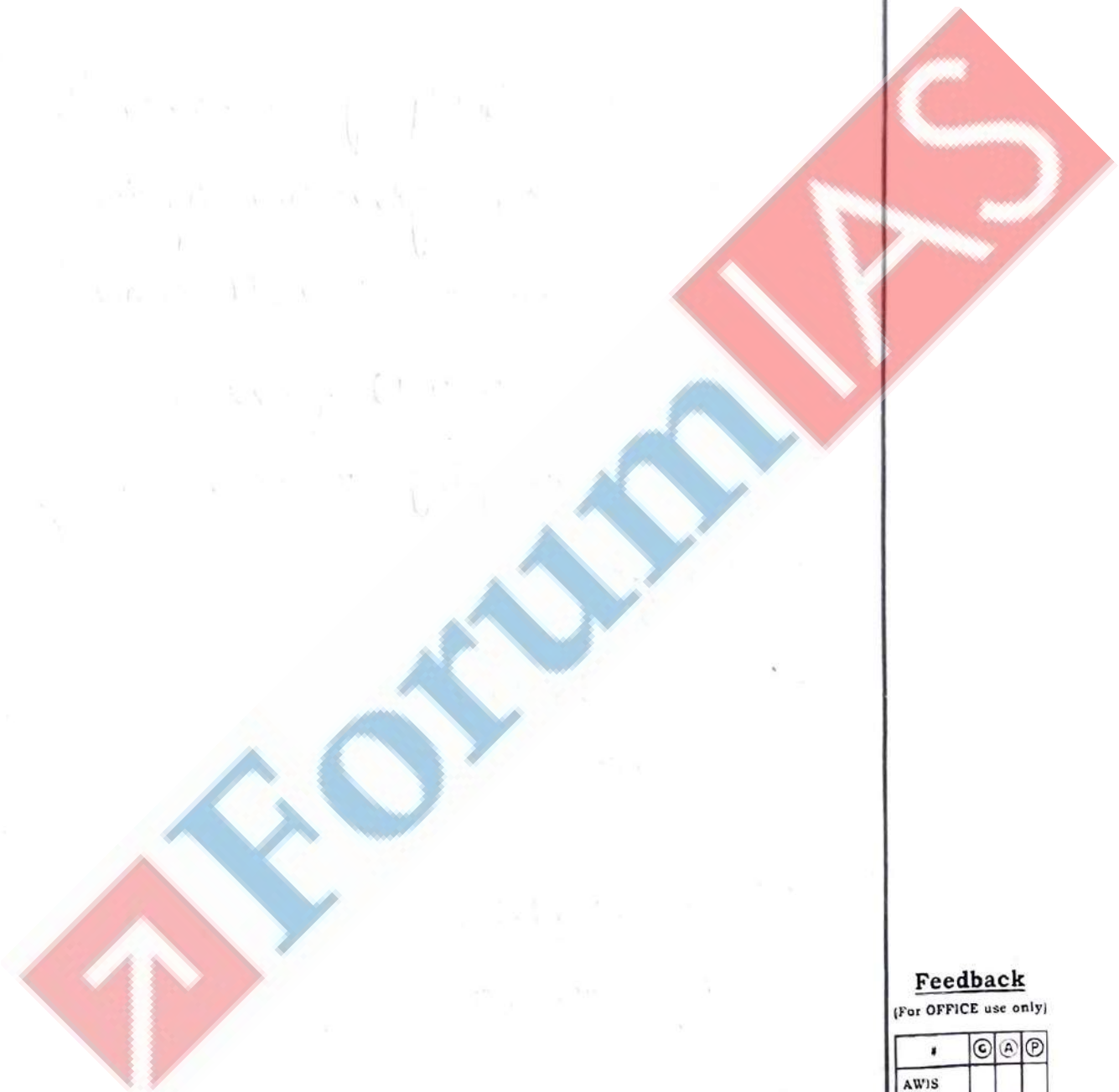
Critique / limited role:

1) Abrogation of Art 370 without any
consultation was misused by splinter
groups to fuel distrust

2) Peace ~~creates~~ ^{ensures} prosperity, but peace
eludes the region → need of smart
financing: night vision camera; Medhuni
Jupit committee recommendations

3) Arms support, ideological support by Pakistan
state) non state actors (Deep state),

Thus, we must carry out deradicalization
measures, along with good governance practices
to nullify local discontent. Vibrant villages
programme is step in right direction'



Feedback

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Q.20) What do you understand by generative Artificial Intelligence (AI)? How can policymakers and regulatory bodies effectively address the concerns and challenges posed by generative AI? (15 marks, 250 words)

जनरेटिव आर्टिफिशियल इंटेलिजेंस (एआई) से आप क्या समझते हैं? नीति निर्माता और नियामकीय निकाय जनरेटिव एआई द्वारा उत्पन्न चिंताओं और चुनौतियों को प्रभावी ढंग से कैसे संबोधित कर सकते हैं? (15 अंक, 250 शब्द)

AI denotes ability of a machine to think like a human, generative AI denotes ability of a machine to generate newer data (image, video, content) from given set of data using principles of machine learning or deep learning.

Eg. • Google's Bard,
• ChatGPT

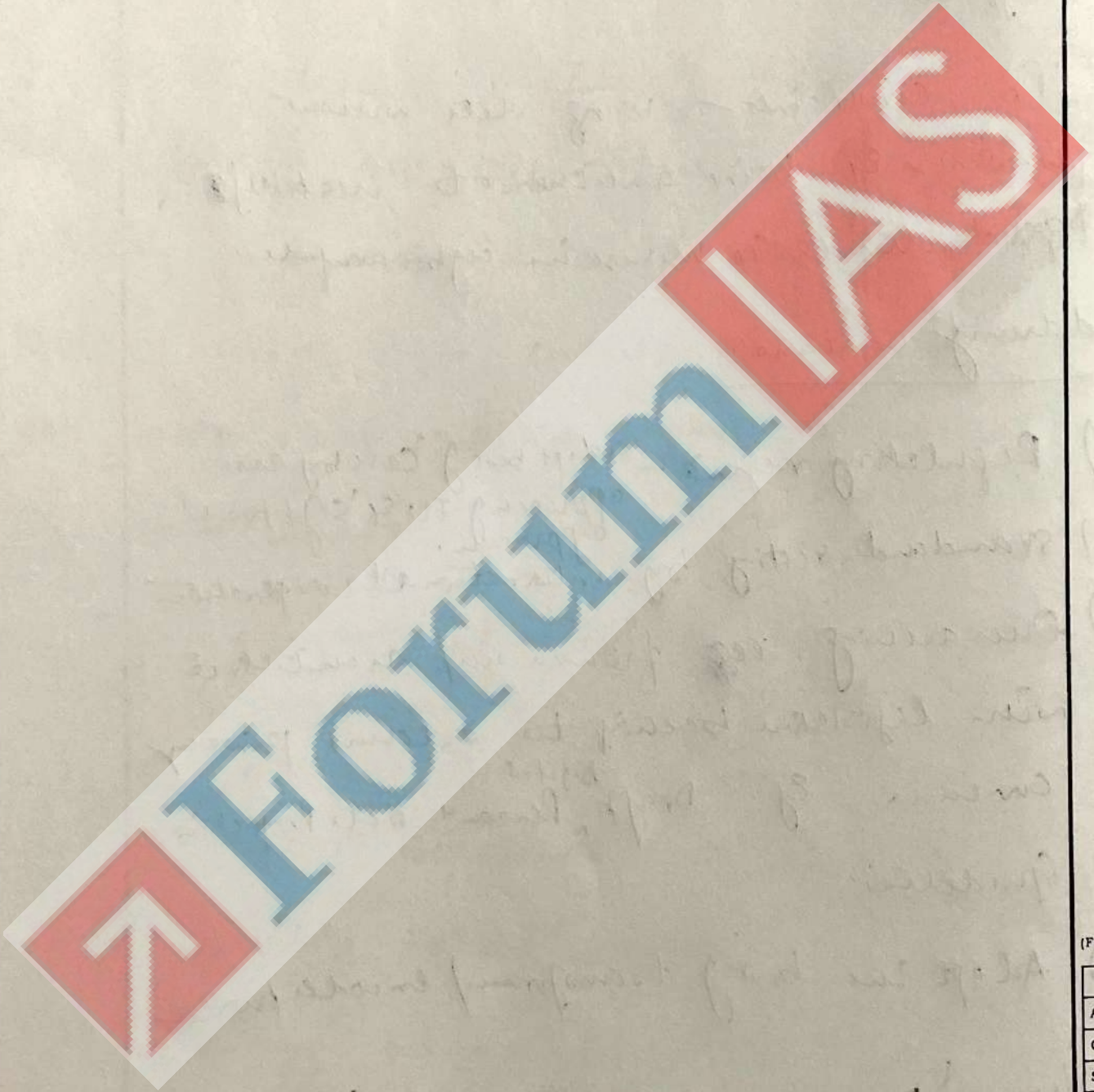
Challenges/Concerns: 1) 'Deepfakes' can be used for fueling hatred & violence.

2) Privacy concerns over data - Eg. Google's Bard accused of using e-mails content to ~~train~~ train itself.

- 3) Surveillance/ Nany state - Eg China using such emerging technologies to monitor systems.
- 4) IPR constraints - using data without permission & being antithetical to 'creativity'.
- 5) Digital divide & misuse in cyberspace.

Addressing concerns:

- 1) Regulatory regime - adopt best of 'case by case' approach EU & 'soft touch' approach.
 - 2) Standard setting by international cooperation.
 - 3) Overarching ~~reg~~ framework/ architecture with legislative backing to address privacy concerns. Eg: Draft ^{Digital} Personal Data Protection Guidelines.
 - 4) Adopt the best of transform/ encode models.
- Thus, 'promote + regulate' must be the policy of India to best leverage Web3.0, IRL4.0 & vision of 'AI for All.'



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