Time Allowed : Three Hours
समय : तीन घंटे

ForumIAS

Maximum Marks : 250
अधिकतम अंक : 250

GENERAL STUDIES / सामान्य अध्ययन

Name Of Candidate परीक्षार्थी का नाग	RAHUL PATIL		
Roll No./अनुक्रमांक	1910105611	Medium/माध्यम	English ✓ हिंदी ☐
Center Code/परीक्षा केंद्र	1901	Date/दिनांक	07/07/2025

*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

Q. No. प्र.सं.	Max. Marks अधिकतम अंक	Marks Obtained प्राप्तांक
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
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16		
17		
18		
19		
20		
Total/कुल अंक	250	

Examiner's Discretion/मूल्यांकन कर्त्ता का विवेक :

Total Marks/कुल अंक :

*Examiner's Discretion is the marks awarded at the discretion of the examiner 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 कर्त्ता का विवेक अंक, आपकी लिखावट, प्रस्तुति, आरेखों के उपयोग, फ्लोचार्ट, तथ्यों और आंकड़ों का समग्र रूप किसी अन्य विषय वस्तु, जो मूल्यांकन कर्ता को आपकी कॉपी में पसंद आयी के आधार पर (लेकिन इन्हीं तक सीमित नहीं) पर दिए गए अंक हैं।

INSTRUCTION / अनुदेश

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. There are **TWENTY** questions printed in ENGLISH & HINDI, all questions are compulsory.

उत्तर पुस्तिका में अंग्रेजी / हिंदी में बीस प्रश्न दिए गए है, सभी प्रश्न अनिवार्य हैं।

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

प्रत्येक प्रश्न / भाग के लिए निर्धारित अंक उनके सामने अंकित किए गए हैं।

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 जाने चाहिए, जो कि दिए गए स्थान में इस प्रश्न–सह–उत्तर (क्यूसीए) पुस्तिका के कवर पर स्पष्ट रूप से लिखा जाना चाहिए।

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।

For Student Only / केवल परीक्षार्थी प्रयोग हेतु

Start Time/प्रारंभ करने का समय :	End Time/समाप्त करने का समय :
4:00 pm	7:25 pm

Mode Of Examination/ परीक्षा की विधि :	Online/ऑनलाइन ☐ Offline/ऑफलाइन ✓

For Office Use Only / केवल कार्यालय प्रयोग हेतु

ECN CODE/ ईसीएन कोड :	EG/ईजी : ① ② ③ ④ ⑤	Evaluation Date/ मूल्यांकन तिथि :

Note: Students are expected to incorporate suggestions from the feedback provided in the answers. Discussion classes for the tests are also available online in your portal to aid in your preparation. Further, students are requested to see the good copies of the tests and learn from them. You can also discuss your copy with a Mentor and discover ways and means to improve your answers, or if you have any issues with this test / copy. Ask specific questions, to get specific answers.
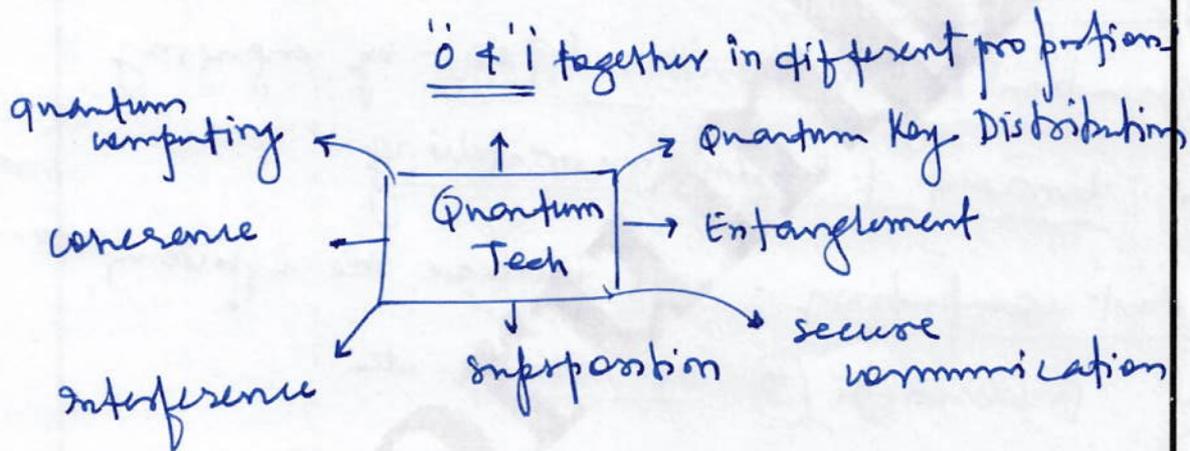
EXAMINER'S REMARKS

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 the 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 and 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, ideas, 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 the subjective components of assessment.

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(Don't Write anythin
in this Area / इस स्थ
पर कुछ न लिखें)

Q.1) How can quantum technologies optimize production processes and improve efficiency in the manufacturing sector?

(10 Marks, 150 Words)

कांटम प्रौद्योगिकियां उत्पादन से प्रक्रियाओं को कैसे अनुकूलित और विनिर्माण क्षेत्र में दक्षता में सुधार कर सकती हैं?

(10 अंक, 150 शब्द)

Quantum technologies leverage the principle of quantum mechanics like entanglement & superposition of standard model for applications in human development.

$\ddot{0}$ & $\dot{1}$ together in different proportion

Quantum computing

coherence

interference

Quantum Tech → Quantum Key Distribution

→ Entanglement

superposition → secure communication

Optimize production Process

① New sensors & materials - using quantum performance of interference

④ electron transport → electricity → new form of semiconductors

② Automation
└ at fast rate using quantum computing

③ improve labour productivity — by database management in Bigdata Analytics with Quantum

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in this Area / इस स्थ
पर कुछ न लिखें)

(4) Production planning. efficient resourcing of
raw materials

(5) Quality control - by using efficient sensors -
with tech. of coherence between product & desired
quality product.

[Improve efficiency]

(1) Quantum key distribution (QKD) - by engaging
in demand & supply mismatching

(2) Fast computing - will increase the efficiency
of production. (9) 3D models etc

(3) Mobilize all resources efficiently - (i) labour.
Raw material & finance with human resource -
to bring efficient signal → Interference tech

(4) Help save cost expenditure on those items that
would go waste — using quantum computing.

Thus, quantum tech opens a plethora of
opportunities to explore
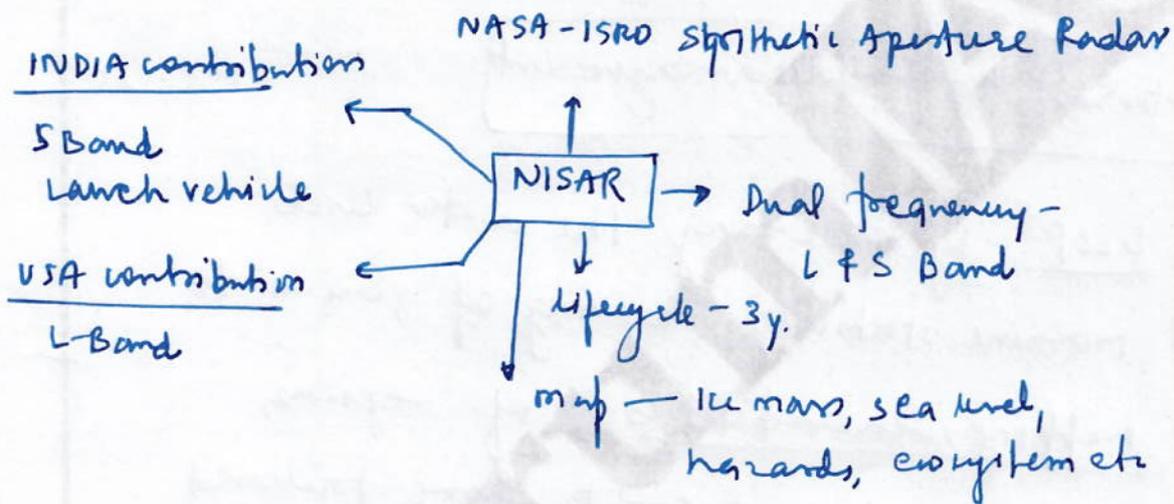
◪ Forum IAS

(Don't Write anythin
in this Area / इस स्थ
पर कुछ न लिखें)

Q.2) What is NISAR mission? How will it help in climate change monitoring and natural hazard management?

(10 Marks, 150 Words)

NISAR मिशन क्या है? यह जलवायु परिवर्तन निगरानी और प्राकृतिक आपदा प्रबंधन में कैसे मदद करेगा?

(10 अंक, 150 शब्द)

NISAR mission is joint mission between India & USA. It is an <u>earth observing satellite</u>, that completes a ~~revolution~~ earth observation in <u>12 days</u>. (map the earth)

NASA-ISRO Synthetic Aperture Radar

<u>INDIA contribution</u>

S Band
Launch vehicle

<u>USA contribution</u>

L-Band

[NISAR] → Dual frequency - L & S Band
↓ Lifecycle - 3y.
↓ map — Ice mass, sea level, hazards, ecosystem etc

Climate change monitoring

(1) <u>Glacial melt</u> - understand rate of melt at poles, mountains.

(2) <u>understand anomalies</u> (es) Karakoram anomaly - glaciers increasing

(3) <u>monitor SLR</u> - checking sea surface Temp. (SST) & addition of meltwater.

(4) Emissions monitor. of GHGs, Carbon, Ozone
et → which impact climate change

(5) Global Heat & Salt Budget — to understand
formation of secondary circulation — like
monsoons, cyclones etc

Natural Hazard Management

---

(1) GLOF — by observing the water levels,
moraine stability, calving of glaciers etc

(2) mapping vulnerabilities — of regions,
people and sectors → to bring tailored
solution

(3) Forest fires — can be monitored to provide
real time EWS for mitigation & evacuation

(4) Research & development — into the
causes & phenomenon to understand.
& share resources among scientists

An open source database could help
revolutionize climate study & disaster management
to achieve Sendai & Paris framework

4

Feedback
(For OFFICE use only)

#	G	A	P
AWIS			
CD & VA			
S & F			
P & R			

Please put tick
marks in the above
table.
Here G is Good, A is
Average and P is
Poor.

TOTAL MARKS	

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(Don't Write anythi
in this Area / इस स्थ
पर कुछ न लिखें)

Q.3) Integration of the Internet of Things (IoT) into our lives can change our world for the better, but it comes with its own set of risks and challenges. Elaborate. (10 Marks, 150 Words)

इंटरनेट ऑफ थिंग्स (IoT) को हमारे जीवन में शामिल करने से हमारी दुनिया बेहतर हो सकती है, लेकिन इसके साथ जोखिम और चुनौतियाँ भी जुड़ी हैं। विस्तार से बताइए। (10 अंक, 150 शब्द)

Internet of things (IoT) as part of Industrial Revolution 4.0 is the integration of various electronic devices & sensors to form a network that can be controlled by the operator
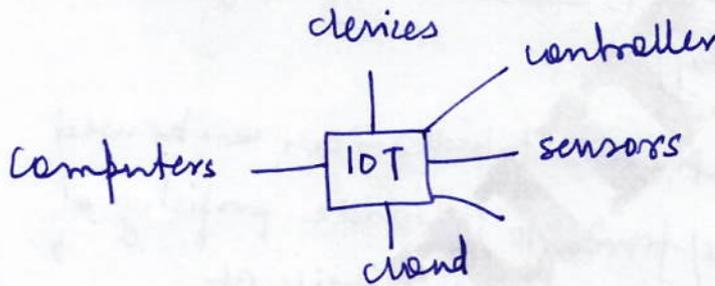
Can change of our lives for better

(1) [Automation/ Tasks] like switching on/off of AC/TV, connecting phone to speaker to kitchen etc → ease of lifestyle → more comfort

(2) [Predict our behaviour] - (eg) people with need of health intervention — can use IoT to during emergency (eg) to compensate disability — difficult to set up.

(3) Monitor events — by <u>sensors</u> to identify key issues & help <u>resolve them</u>. by <u>taking decisi</u>

(4) <u>Database management</u> — with IoT & cloud computing — to analyze big data.

<u>Risks & challenges</u>

(1) |Privacy intrusion| — by the devices with numerous sensors & cameras — [<u>ks Puttaswamy judgment</u> — called for Right to Privacy]

(2) |Data security| — Data about behaviour can be used by & the operators/firms to provide ~~profiling of~~ individuals, steam financial details etc

(3) |State surveillance| — the fear of state controlling the algorithm, of device, & behaviour of individuals (eg) Chinese govt through apps.

(4) |Dependency| on devices — affects <u>cognitive abilities</u>

(5) |Grievance Redressal| — for any act of harm caused by the device

With <u>proper</u> regulation of devices (eg. GDPR of EU). the privacy & data security can be resolved

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in this Area / इस स्थ
पर कुछ न लिखें)

Q.4) Explain the 'Raman Effect' discovered by Sir C.V. Raman and show how it revolutionized the field of molecular physics.

(10 Marks, 150 Words)

सर सी.वी. रमन द्वारा खोजे गए 'रमन प्रभाव' की व्याख्या कीजिए तथा बताएं कि इसने आणविक भौतिकी के क्षेत्र में किस प्रकार क्रांति ला दी।

(10 अंक, 150 शब्द)

Sir CV Raman, discovered the Raman effect (1928) for which he got a nobel prize in Physics. It is related to inelastic scattering of light by matter.

light
λ_e (particle)

[elastic]
Rayleigh scattering
$\lambda_e = \lambda$ scattered

Raman scattering
$\lambda_e < \lambda$ scattered.
[inelastic]

Process
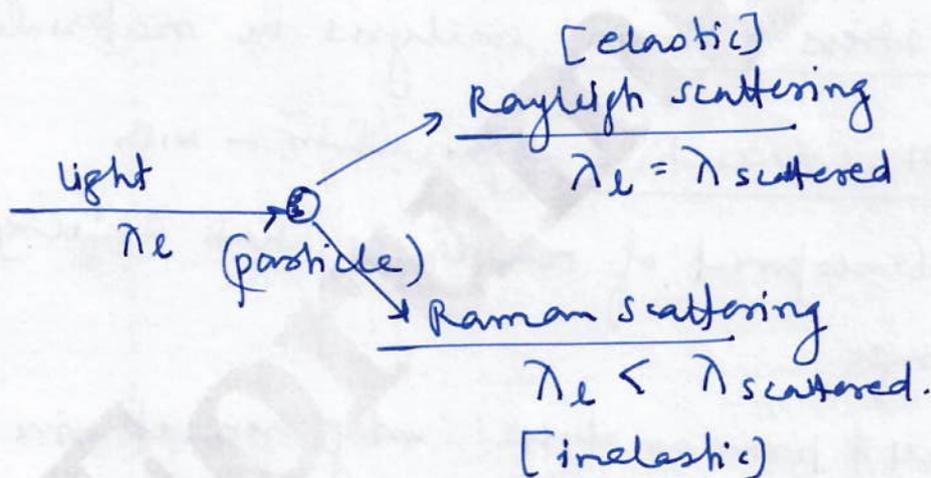
- when a beam of light (monochromatic) is incident on particles - about 9/10th of scattered particles show elasticity (Rayleigh)

- But 1/10th of scattered rays show inelastic behaviour ie the scattered photon have different energy

Revolutionized molecular physics

(1) Identify <u>unknown compounds</u> - in a mix of different compounds by studying light reaction, etc to identify <u>structure & bonding</u>

(2) Track <u>chemical reaction progress</u> in real time

(3) Assessment of <u>purity</u> of substances

(4) <u>Stress & strain</u> analysis in materials

(5) <u>Pharmaceutical application</u> — with development of new drugs, check efficacy of drugs

(6) <u>Cell & tissue analysis</u> - using non intrusive detection technique.

Thus, <u>Raman effect</u> finds a lot of <u>uses</u> & which can help in environmental pollution <u>detection</u>, detection, <u>new tech</u> development etc.

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पर कुछ न लिखें)

Q.5) Biofuels can play a role in energy security by reducing India's reliance on imported fossil fuels and diversifying its energy mix. Examine.
(10 Marks, 150 Words)

जैव ईंधन भारत की आयातित जीवाश्म ईंधन पर निर्भरता को कम करके और इसके ऊर्जा मिश्रण में विविधता लाकर ऊर्जा सुरक्षा में भूमिका निभा सकते हैं। परीक्षण करें।
(10 अंक, 150 शब्द)

<u>Biofuels</u> are fuels generated by organic components. ④ generation of biofuel include

(a) non-edible - sugarcane (c) Algae -

(b) edible (non) - Jatropha (d) 4m -

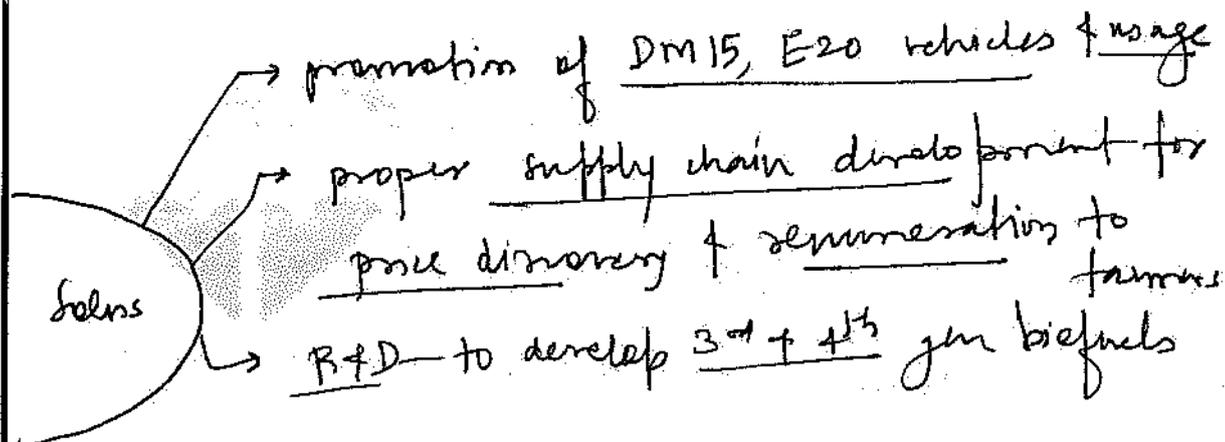<u>Role of Biofuels — ↓ India's import dependency</u>

(1) | Reduce oil imports | about 80% of fuel is imported — crude oil — Iran, Saudi, US, Venezuela NG - Qatar

(2) | Preserve Foreign Exchange | - • to use it in times of emergency.

(3) | Geopolitical advantage | — no more hyphena- tion & measured opinions.

<u>Diversify energy mix —</u>

(4) currently coal dependent — ⑤⑤% of energy mix

(5) Remunerate farmers — double income (Dalwai committee)

(6) complement Renewable Energy — currently at 210 GW. to reach 450 GW by 2047.

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पर कुछ न लिखें)

Challenges of Biofuels

(1) overdependence on 1st gen - diversion of food crops to biofuels - affect food security.

(2) supply chain infrastructure - is underdeveloped. → affecting the supply & demand mismatch.

(3) Retrofitting of engines - to utilize biofuels

(4) Demand creation & price volatility -
  (5) factors of monsoon → price shoot.

(5)

Solns
  → promotion of DM 15, E20 vehicles & usage
  → proper supply chain development for price discovery & renumeration to farmers
  → R&D - to develop 3rd & 4th gen biofuels

with proper impetus, it can elevate both agriculture & industrial output leading to Balanced sectoral development.

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पर कुछ न लिखें)

Q.6) Define Environmental Impact Assessment (EIA) and bring out its significance in promoting sustainable development in the country. (10 Marks, 150 Words)

पर्यावरण प्रभाव आकलन (EIA) को परिभाषित करें तथा देश में धारणीय विकास को बढ़ावा देने में इसके महत्व पर प्रकाश डालें। (10 अंक, 150 शब्द)

EIA is a model of analysing the impacts of a project on the environment, suggesting alternatives, participation of local population & then decision making to bring the best results for -3P- profit, people & planet.

| Process of EIA | & | significance |

(1) Preliminary Analysis - with scoping & screening process to identify the kind of scrutiny.
 ↳ helps deal with case by case basis

(2) Assessment & Prediction of the projects to predict any few potential defect in planning → helps bring issues to the fore for people to judge

(3) Public participation - public consultation to gather input from affected communities
 ↳ gives decision making powers to people

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(4) Reporting & review — of the project detailed review (DPR) — extensive knowledge analysis.
↳ keeping in mind resources at hand & their utilization

(5) Decision making — keeping all sectors, stakeholders & impacts in mind.
↳ ensures future generations are not affected by the impact.

(6) monitoring & review — of the project with special audits etc
↳ helps communities keep an eye on the proceedings after project starts

Thus, with each step, EIA ensures that the principles of sustainability are upheld

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पर कुछ न लिखें)

Q.7) "Integrating technology at various stages of disaster management can enhance the effectiveness of disaster response strategies." Elucidate.
(10 Marks, 150 Words)

"आपदा प्रबंधन के विभिन्न चरणों में प्रौद्योगिकी को एकीकृत करने से आपदा प्रतिक्रिया रणनीतियों की प्रभावशीलता बढ़ सकती है।" स्पष्ट करें।
(10 अंक, 150 शब्द)

Technology has the ability to enhance human capabilities. Disaster management can utilize technology at each step to bring effitives

Integrating Technology & Disaster Management

(1) **Pre- Disaster**

(a) <u>Risk Analysis</u> — sensors to detect potential risk
(s) GIoF

(b) <u>Hazard zonation</u> (es) Flood zonation by satellite tech

(c) <u>Vulnerability mapping</u> (e) Big data Analytics

(d) <u>Preparedness</u> (es) Technology intervention like

(e) deployment of <u>resources</u>, develop shelter etc

(2) **During Disaster**

(a) Rescue Deployment — of forces (es) Air transport by chinook aircraft/helicopter

(b) Rescue ops — by using <u>social media</u>, night detection cameras, thermal cameras

(c) Identifying victims — by using <u>DNA tech</u> etc.

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(Don't Write anythin
in this Area / इस स्थ
पर कुछ न लिखें)

(d). Info dissemination - alerts & Early warning system in Real time - supercomputers that forecast events.

Post Disaster

(1) Redevelopment - critical infrastructure like telecom services, bridges, cyberphysical systems require technology infusion.

(2) Lesson learning & prevention of further such events - using buoys, sensors etc to identify key areas vulnerable.

(e) Tsunami - key areas of Tsunami - Sunda trench

(3) Sustainable development - of all regions with maintaining ecological integrity.

Thus, technology can help overcome key challenges that plague disaster management & help achieve the objectives of Hyogo & Sendai framework.

⤢ **Forum IAS**

(Don't Write anythin
in this Area / इस स्थ
पर कुछ न लिखें)

Q.8) The recent spike in terror-related incidents in Jammu and Kashmir has raised serious concerns within the country's security establishment. Highlighting the reasons for this spike, suggest steps to counter it.

(10 Marks, 150 Words)

जम्मू-कश्मीर में हाल ही में हुई आतंकी घटनाओं में वृद्धि ने देश की सुरक्षा संस्थाओं के सामने गंभीर मुद्दें उत्पन्न किए हैं। इस वृद्धि के कारणों पर प्रकाश डालते हुए, इससे निपटने के लिए उपाय सुझाएँ।

(10 अंक, 150 शब्द)

The recent Pahalgam attack shows the prevalence of terrorism in the valley, which raises concerns for Nation's security.

---

serious concerns — Reasons for spike

---

(1) POLITICAL

(a) cross border support - from Pakistan - training + recruitment + supply of weapon + funding.

(b) Power vacuum in Kashmir - after abrogation of Article 370 + demotion from statehood to UT.

(c) Political groups like Hurriyat & peoples support to them

(2) SOCIAL

(a) Socioeconomic backwardness - forcing people to poverty → creates opportunities for joining

(b) Radicalization - by social media groups & channels + algorithm of social media to echo same opinions & content.

(3) ECONOMIC

    (a) Lack of industrial development

    (b) per capita income is ~ less — leading
        to entrepreneurship

    (c) FICN, money laundering by terrorist groups
        in Kashmir to pump & utilize them

STEPS TO COUNTER

(1) |Prevent|

    (a) socioeconomic development — By reforms in

    agriculture, ① horticulture cluster;

    industries ② Tourism

    (b) security arrangement — prevent infiltration

    of terrorists, by network of J&K police, Army,

    Intelligence etc ③

(2) |mitigate|

    (a) curb the funding — by interrupting trails.
        └ ④ PMLA 2002

    (b) Rehab policy — to bring back the youth to
        mainstream ⑤ Majid Nawaz — Football
                          star

    it needs
Thus coordinated efforts of state, police,

criminal justice system and development industry

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Q.9) Examine the role of the National Investigation Agency (NIA) in countering various internal security threats faced by the country.
(10 Marks, 150 Words)

देश के सामने आने वाले विभिन्न आंतरिक सुरक्षा खतरों का सामना करने में राष्ट्रीय जांच एजेंसी (NIA) की भूमिका का परीक्षण करें।
(10 अंक, 150 शब्द)

NIA was established by NIA Act 2008 after the 26/11 attacks, to prevent & mitigate the terrorist activities. It has powers under UAPA 1967.

Role of NIA in countering

(1) Intelligence gathering & collation — of any activity identified as unlawful

(2) search & seizure of persons & property associated with it — by Inspector officer.

OGW
Terrorism,
Punjab insurgency
Mob violence
Terrorism piracy-
Somalia

Insurgency
FICN

LWE
coastal security

Various Internal security issue

(3) Investigation — by IGP level officer

(4) Can have powers — outside India and also over individuals under schedule 4 of UAPA.

(5) Present a report after filing chargesheet — within 180 days + can designate session court → special court

(6) Zahoor Ahmad Watali case — SC upheld the powers of NIA.

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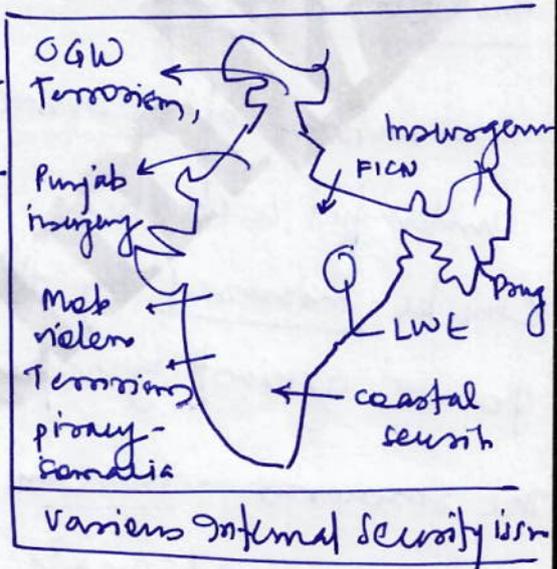
<u>Role has also been critiqued</u>

(1) <u>Conviction rate</u> - is low of about <u>6%</u>. Thus, abundance of <u>undertrials</u>.

(2) Presumes <u>guilty until proven innocent</u> - against the <u>natural justice principle</u>.

(3) <u>Burden of proof</u> lies on the <u>accused</u>.

(4) Accusations of <u>excessive powers</u> in the name of unlawful activities.

(5) Can be <u>misused</u> by the <u>political party</u> in power against groupings of <u>opposite ideology</u>.

(6) The resources — <u>human, financial & infrastructure</u> has been <u>inadequate</u>.

(7) increased burden on the already <u>overburdened</u> <u>courts</u>.

For a true federal agency like NIA, there is need to provide it with powers but with caution to prevent any <u>miscarriage of justice</u> or <u>innocent</u> a <u>trial ordeal</u>.

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Q.10) While the operational advantages of Integrated Theatre Commands (ITCs) are well-acknowledged, the path to implementation is fraught with challenges. Discuss in context of India.
(10 Marks, 150 Words)

इंटीग्रेटेड थिएटर कमांड (ITC) के परिचालन लाभ सर्वविदित हैं, लेकिन कार्यान्वयन का मार्ग चुनौतियों से भरा है। भारत के संदर्भ में चर्चा करें।
(10 अंक, 150 शब्द)

Integrated Theatre command (ITC) are military structures where all 3 forces — Army Navy & Air force operate under single command. for a particular theatre
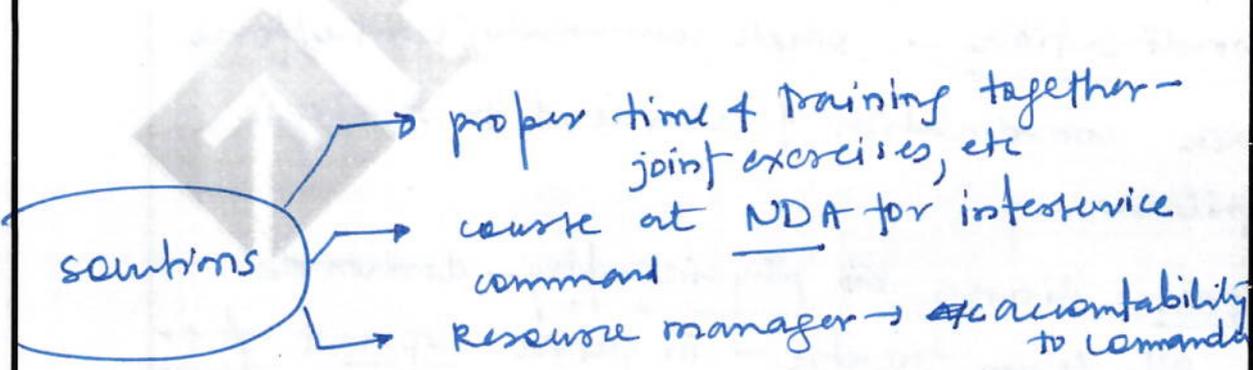
     (eg) A+N command

|Operational Advantages|

(1) unified force — pick the best abilities of each force — (eg) Air force — tough terrain
                    Army — deep penetration
                    Navy — Naval base for fighterjet launch.

(2) coordination — single commands/service/force lack coordination & can lead to strategic failures

(3) India — diverse physiography — demands all forces theatre — in future — space & cyber

(4) utilization of resources — be it equipments, financial or personnel (4) Doctors, medics etc. efficiently.

(5) geopolitical & strategic advantage – over enemy countries (6) Near Himalayas, etc

| Implementation Challenges |

(1) command leader choice – which force should provide as operational know how of each force is to respective officers.

(2) coordination – difficult to manage resources at hand with diverse backgrounds & training. → camaraderie between forces is key

(3) cross-force cultural differences

(4) Technological integration between the weapons & components of all 3 forces –

solutions
→ proper time & training together – joint exercises, etc
→ course at NDA for interservice command
→ Resource manager → etc accountability to commander

CDS can take up bigger responsibility to manage the ITCs in an efficient manner

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Q.11) Biotechnology, by integrating biological sciences with technological innovations, offers compre-hensive solutions to some of the most pressing challenges in food production, waste management and human health. Elucidate.

(15 Marks, 250 Words)

जैव प्रौद्योगिकी, जैविक विज्ञान को तकनीकी नवाचारों के साथ एकीकृत करके, खाद्य उत्पादन, अपशिष्ट प्रबंधन और मानव स्वास्थ्य में कुछ सबसे महत्वपूर्ण चुनौतियों के लिए व्यापक समाधान प्रदान करती है। स्पष्ट कीजिए।

(15 अंक, 250 शब्द)

Biotechnology is a field that uses technology to analyse, mimic & augment biological processes. for products & services for human use
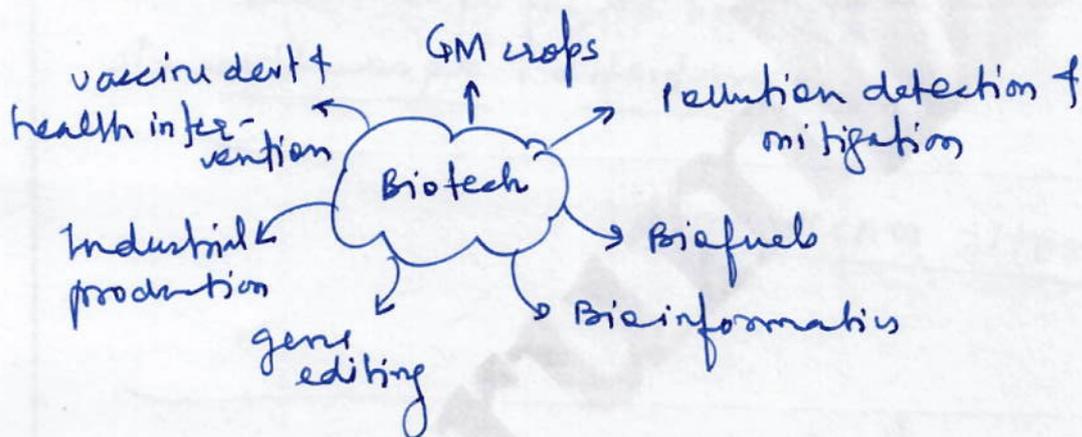
the Solutions to Challenges in

(A) Food Production

Challenge	Solution
① production is Low.	① using GM crops
	② New hybrid varieties
	③ Pest & Disaster resistance
	④ low input requirement
	⑤ Nutrient fortification

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① Availability-
distribution
challenge

③ Affordability
price etc

⑥ supply chain — biofuels.

⑦ improve shelf life — for better
transportation.

⑧ Fermentation

⑤ mass production of crops. &
other products

⑩ food safety at low cost

⑪ probiotics, aquaculture etc

Ⓑ   WASTE MANAGEMENT

Challenge	Solution
① Pollution & waste	Ⓕ Bioremediation techniques ↳ using microorganisms to breakdown organic matter
	② metal extraction ③ gold, copper from e-waste
② Waste to Energy	③ Biofuel generation ⑤ ∈ waste → gasification — syngas
	④ useful products — by composting, bioplastics, etc

③ Biosensors | ⑤ FRM monitor waste generation +
supply chain

⑥ to categorize waste (is) Biomedical
waste.

© __HEALTH INTERVENTION__

Challenge	Solution
① Diagnosis	① biosensors - to help analyse - medical isou + ELISA test
② Pharma	② development of new drugs
	③ recombinant DNA tech - to produce proteins, insulin etc
③ production	④ vaccine development (es) DNA vaccine
④ gene therapy -	⑤ Tissue reengineer. in Lab
	⑥ Stem cell research — to produce new parts & organs
⑤ Personalized medicare	⑦ for rare diseases

Biotech can also bring ill effects + hence
proper regulations of new products &
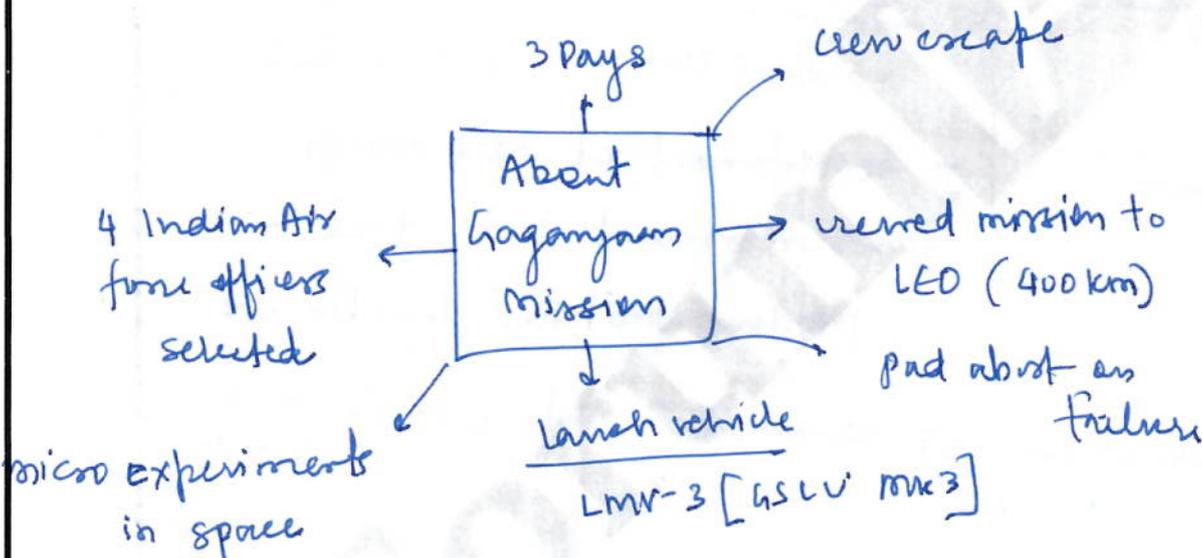interventions is key to minimize ethical challenges

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पर कुछ न लिखें)

Q.12) Describe how the Gaganyaan mission can help achieve India's broader national objectives. Also, throw light on the key challenges that the mission faces. (15 Marks, 250 Words)

बताइए कि गगनयान मिशन भारत के व्यापक राष्ट्रीय उद्देश्यों को प्राप्त करने में किस प्रकार सहायक हो सकता है:-साथ ही, मिशन के समक्ष आने वाली प्रमुख चुनौतियों पर भी प्रकाश डालिए। (15 अंक, 250 शब्द)

Gaganyaan is India's indigenous attempt to send humans beyond Karman line ie to space.

About Gaganyaan Mission
- 3 Days
- crew escape
- crewed mission to LEO (400km)
- Pad abort as failure
- Launch vehicle LMV-3 [GSLV MK3]
- micro experiments in space
- 4 Indian Air force officers selected

It can help achieve National Objectives

(1) Technology demonstration - showing indigenous capabilities to the world.

(2) Credibility & Brand Value of ISRO - will help get more revenue by partnerships & launches

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(3) Develop critical technologies
- → Human spaceflight
- → orbital habitation module
- → life support system

(4) for future endeavours :
- (a) Sending humans to moon, mars etc
- (b) extra planetary explorations
- (c) Eestablish Indian permanent space station

(5) scientific experiments
- in microgravity, space biology & other areas

Key Challenges to the Mission

(1) Development of advanced tech - to space habitation requires critical tech

(2) Rigorous austronaut training - for physical & phychorogical wellbeing

(3) safety issues - with launch, in orbit & descend situations

(4) Radiation shielding - space not protected by ozone.

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(5) Emergency abort & exits — crew escape system needs to be reliable to avoid any loss of life

(6) Ground Infrastructure - mission control with 24×7 monitoring & decision making

(7) Critical minerals for the launch - need to be imported. Hence, shows dependency.

(8) Financial — to make it costeffective with the Budgetary constraints

unmanned space missions

Quality control

collaboration in critical tech

Solutions / Way Forward

waste management

Rigorous testing

Health & psychological management

proper training

(2) India used french help

Gaganyaan mission can help achieve a unique crown in the world of space tech

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Q.13) The recent stampedes in the country highlight the multiple factors responsible for such tragedies. Elaborate. Also, outline the key aspects of NDMA's guidelines on "Crowd Management" to prevent such incidents.

(15 Marks, 250 Words)

देश में हाल ही में हुई भगदड़ की घटनाओं ने ऐसी त्रासदियों के लिए जिम्मेदार कई कारकों को उजागर किया है। सविस्तार वर्णन कीजिए। साथ ही, ऐसी घटनाओं को रोकने के लिए "भीड़ प्रबंधन" पर NDMA के दिशा-निर्देशों के प्रमुख पहलुओं को रेखांकित कीजिए।

(15 अंक, 250 शब्द)

Recent cases of deaths at Kumbh Mela & RCB victory parade highlight the difficulty in crowd management.

| Multiple factors responsible |

A. STRUCTURAL

  1. Structural collapse - eg bridges, roads etc
  2. Lack of emergency exit eg theatres, malls

B. MANAGEMENT SIDE

  1. Analysis & risk study of crowd - insufficiently drawn

  2. lack of public address system - to manage & control panicking crowd eg Elphinstone bridge - 2017

  3. inefficient seggregation of crowd - ist inlet & outlet

  4. coordination gap - due to lack of satphones & communication

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5) uncontrolled invite – to the event without analysing seating/holding capacity.

c) CROWD BEHAVIOUR

1) star culture – to get a glimpse, touch or autograph
   - eg) Allu Arjun film screening event

2) Panic mode – herd mentality → panic by one – leads to panic for all others

3) Not keeping safe distance during entry & exit which are generally narrow

4) Fake news – like fire, police lathi charge etc

· In order to prevent such incidents,

NDMA has released guidelines

(1) STRUCTURAL
   (a) wide, well managed entry & exit points
   (b) capacity handling
   (c) Retrofitting the structure before the event
   (d) separate tracks/lanes for entry/exit.

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(e) gaps between rows to provide buffers.

(f) medical facilities at the site

(g) PA system to announce the crowd about updates & news

[2] NON-STRUCTURAL

(A) Handle VIP visitors — separate SOP for such

(b) Analytical study of anticipated crowd with simulating models

(G) Volunteer involvement to control crowds

(d) Traffic & parking lot management

(e) Research on crowd behaviour.

(f) Crowd control & dispersal methods - water cannons, smokes etc

Efforts on the parts of both management of events & the crowd sensibility could help prevent such incidents.

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Q.14) "Mangroves contribute significantly to the coastal economy and ecology, but they are threatened by numerous factors". Elaborate. Also, state the measures taken by the government for mangrove conservation and restoration.

(15 Marks, 250 Words)

"मैंग्रोव तटीय अर्थव्यवस्था और पारिस्थितिकी में महत्वपूर्ण योगदान देते हैं, लेकिन वे कई कारकों से खतरे में हैं"। सविस्तार वर्णन कीजिए। साथ ही, मैंग्रोव संरक्षण और बहाली के लिए सरकार द्वारा उठाए गए उपायों के बारे में भी बताएँ।

(15 अंक, 250 शब्द)

About ____ of India's forests is Mangrove.
Yet, there are threats to It which needs resolution.

Mangroves → Mangroves of India
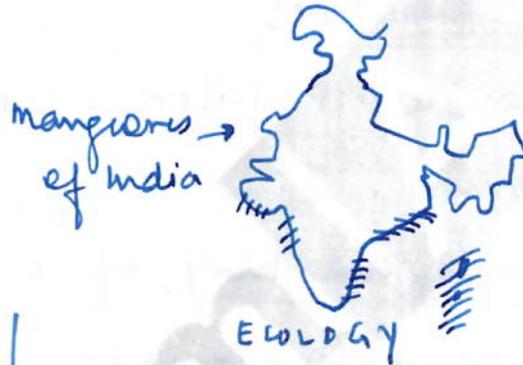
| Contributions | - to coasts |

ECONOMY	ECOLOGY
① Livelihood - various provisional services like - products of leaf, roots	① Natural Buffers - against Disasters like storm surges, Tsunami
② MFP - Avicenna, Sundari etc have products for tribals	(4) Pallikaoni - during 2004 Chennai Tsunami
	② Habitat - to forest fauna
	(4) Bengal Tiger in Sunderban
③ Agricultural Development - 5 By protecting coastal Saltwater intrusion	(4) Unique fishes
	③ Carbon sequestration - high potential
④ Industrial - provide raw material to Industries	④ Net primary productivity 73000 kJ.
	⑤ Filtration of Pollution

Threats

(1) coastal encroachments - for Urbanization

(b) Pallikarni, Chennai - encroached

(2) Deforestation - to build harbours, ports, jetties

(b) Kolkata & Haldia port

(3) Loss of Biodiversity - poaching of fauna (c)
otters, fishes etc

(4) Aquaculture - (d) Prawns, cultivation in
Andhra coast

(5) coastal development - (e) A&N Islands -
Great Nicobar project

(6) Overuse of resources - (f) MFP

(7) Energy security - Extraction of oil & natural
gas (g) KG Delta, Cauvery delta.

(8) Oil spills - (h) off the coast of TN in Gulf of
Mannar - leads to mangrove loss.

| Measures | – by govt. |

| CONSERVATION | RESTORATION |

CONSERVATION

① MISHTI - to protect mangrove ecosystem

② Forest laws (Amendment) - to strengthen the protection of key species like Avicenna

③ community participation - to protect in collaboration

ⓐ Tribes like Onge, Jarawa etc

④ Coastal management - CRZ Notifications

⑤ Role of institution & bodies ⓔ Coastal police, ICG, Navy etc

RESTORATION

① Planting of local varieties ⤶ for growth

② Prevent over sedimentation of mangroves

③ Miyawaki method Japanese style of protecting & regrowing trees in density

④ Aquaculture - growing native fishes & feeds for sustainable fishery

⑤ Reclamation of encroached land - by seed development, certification, distribution

mangroves are key to ecology & economy. India joined mangroves for future knowing its potential

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Q.15) Despite notable improvements in India's disaster management framework since 2005, challenges persist in ensuring timely response and effective coordination during crises. Analyse.

(15 Marks, 250 Words)

वर्ष 2005 से भारत के आपदा प्रबंधन ढांचे में उल्लेखनीय सुधार के बावजूद, संकट के दौरान समय पर प्रतिक्रिया और प्रभावी समन्वय सुनिश्चित करने में चुनौतियाँ बनी हुई हैं। विश्लेषण करें।

(15 अंक, 250 शब्द)

Post 2004 Tsunami, India passed & NDMA Act, 2005. It has been brought paradigm shift to Disaster management (DM) in India, albeit with some caveats.

Notable Improvements

(1) Renewed management - comprehensive coverage from earlier haphazard

(2) Reduction in loss of lives

(3) Economic cost of Disasters has reduced

(4) Impact of Disaster reduced despite the frequency increasing.

For eg) Cyclone Super of 1999 - Odisha coast - high disaster

Amphan 2020 - Also a super cyclone - but very few casualties

(5) Awareness among people ↑

(6) NDM Authority - ever ready to serve at the earliest

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(7) <u>Centre - State coordination</u>   NDMA
↓
Le 3 tier structure t. DM   SDMA
↓
DPMA

Yet, challenges persist

(1) <u>Financing</u> disaster management - has been
below par
⤷ <u>Budgetary allowing</u> is below par
⤷ 15th FC - recommended <u>NDME Fund</u> to
improve funding & relief

(2) <u>Delay</u> in procurement of <u>equipment</u>

(3) <u>Working & Training</u> of <u>DPMA forces</u> are
not skilled to the requirement of the job.

(4) <u>Post Disaster</u> - 5R strategy —Rescue —Relief—
Rehab — Recover & rebuild → not incorporated

(5) <u>Prevention of disaster</u> - still not taken. only
focus on <u>mitigation & adaptation</u>

(6) <u>Traditional & local knowledge</u> on disaster -
yet to be used

(7) coordination challenge - b/w different forces
NDMA, DDMA, SDMA & volunteer groups

Response & effective coordination

(1) 3 f — Funds → enough & adequate funds
    ↳ off budget borrowing
    → Bonds & other instruments
- Functionaries — fix SOPs & g roles
- Functions — reduce friction, bring collab &
  have distinct jurisdiction

(2) multipronged strategy — to include multiple
disasters + response at once.
    ⓔ Earthquake in hilly region = Landslides

(3) Deploy EWS system to prevent any impending
disaster ⓔ GLOF EWS in South Lhonak lake
                                        Sikkim

(4) community participation — at all stages of
disasters

(5) using & documenting traditional knowledge
        ⓔ colour of soil, behaviour of animals.

   Need to combine Sendai, Paris & SDG to
get the desired results.

Q.16) Alongside the alarming depletion, rising pollution levels of groundwater resources are exacerbating the water crisis in India. In light of the statement, discuss the reasons for groundwater pollution in the country. Suggest remedial measures and mention the initiatives taken by the government in this regard.

(15 Marks, 250 Words)

भूजल संसाधनों में खतरनाक कमी के साथ-साथ प्रदूषण का बढ़ता स्तर भारत में जल संकट को और बढ़ा रहा है। इस कथन के आलोक में, देश में भूजल प्रदूषण के कारणों पर चर्चा करें। इस संबंध में सुधारात्मक उपाय सुझाएँ और सरकार द्वारा की गई पहलों का उल्लेख करें।

(15 अंक, 250 शब्द)

GW reservoirs of water are factor of porosity, permeability and geological structure of the region. Reduction in quality & quantity is alarming

Yamuna - Arsenic

Lower Ganga belt
↳ Uranium,

Punjab Depletion

Alarming Depletion
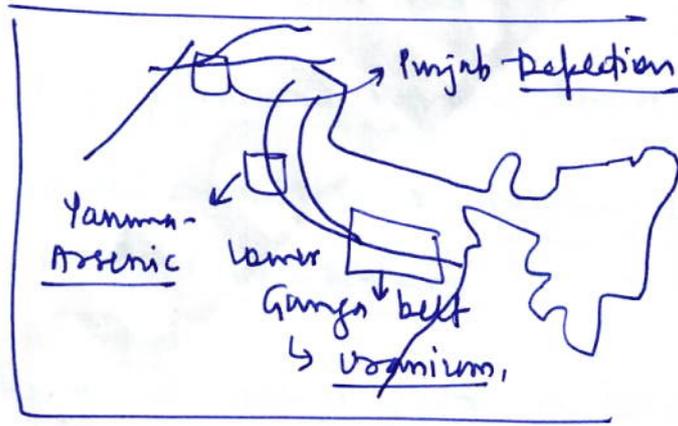
(1) Overextraction -

for Agriculture
(e) Punjab - high extraction → capillary effect
→ salinization of soil

(2) Lack of Recharge - due to reduced rainwater and addition by glacial melt.

(3) Drying of river waters - especially South India - leads to ↓ of water level

(4)

Rising pollution level & Reasons

(1) Arsenic pollution - by flow of effluents-
from Industries (eg) Yamuna belt near Delhi
                                          mathura

(2) Uranium Pollution - (eg) lower ganga — near WB —

(3) underground contamination — from geological
& - chemical reaction

(4) Accumulation by over extraction — leading to
ra. biomagnification of pollutants

(5) Agriculture — overuse of fertilizers - NPK -
going to water - cause entrophication.

Reasons (6) Infrastructure - breakdown of
underground pipelines release petroleum into

(7) settlement - waste generation & dumpsite →
seep through ground to reach.

(8) coastal intrusion of saltwater - affects the
GW level & contaminate it.

Remedial measures	steps

Remedial measures

① GW recharge by Infiltration
   (eg) Rain water harvesting

② Reduce over extraction –
   pricing of GW extraction
   to make it valuable

③ Restoration of lowered GW
   by – providing water
   (eg) linking basin

④ Prevent the contamina-
   - tion –
   ↳ by sewage water
   treatment + affluent
   management.

⑤ using technology to
   purify GW
   —

steps

① 'Catch the rain'
   Campaign

② Watershed
   management

③ PMKSY –
   - micro irrigation
   - efficient use
   - A500 forestation
   – River Water Linkage
   project
   (eg) Kosi mechi

④ Bringing agriculture
   under water charge

⑤ for household – Jal
   Jeevan mission

⑥ 'electrostatic
   precipitation

with water demand reaching $>1500 \text{ km}^2$,
and supply nearing scarcity level of 1000 km^2,
it is time to reform the water usage.

Q.17) Describe how the linkage between terrorism and organized crime poses challenges to internal security. What measures would you suggest to tackle this nexus and the threats emerging from it?

(15 Marks, 250 Words)

आतंकवाद और संगठित अपराध के बीच संबंध किस तरह आंतरिक सुरक्षा के लिए चुनौतियां पैदा करते हैं, इसका वर्णन करें। इस गठजोड़ और इससे उत्पन्न होने वाले खतरों से निपटने के लिए आप क्या उपाय सुझाएँगे? (15 अंक, 250 शब्द)

<u>Terrorism needs organized crime</u> to fund its activities, while <u>org. crime</u> feeds of the activities by creating more demand for the sales etc. Thus, there is a <u>nexus</u>.

| Terrorism & Unorganized Crime | - Linkage

(1) <u>Funding</u> - unorganized crime like <u>Hawala</u> transactions, <u>smuggling</u> of drugs & weapons, <u>extortion</u> etc — acting like an economic activity outside the <u>regulatory structure</u> → funds terrorism

    ⓔ Houthi & Hizbollah supported by Iran state
    <u>Al Qaeda & ISIS</u> — by controlling the oil supply

(2) <u>Creation of demand</u> - terrorism breaks down the functioning of normal services, creating <u>vacuum</u> , which is filled by the ~~org.~~ org. crime → ⓔ Punjab – militancy of 1980s but org. crime of illegal drugs continues

(3) <u>Supply chain management</u> - of equipments, blast materials like IEDS, weapons for terrorism — by org. crime

     (eg) Pulwama attack — 40kg IED ⇒ brought by <u>OGW</u> working in valley.

Threats from Nexus

(1) <u>National security</u> - affected. Thus, threat to <u>Sovereignty</u> of nation (eg) Terrorist attack in <u>J&K</u>

(2) <u>Socioeconomic</u> - people can fall to attractions like drugs, weapons etc. & mafia culture
     (eg) Punjab

(3) <u>Economic challenge</u> — org. crime run parallel economy affecting <u>revenue generation</u> & loss of GDP to nation

(4) <u>Regional & Global order</u> — these can become influential

(5) Mass <u>exodus</u> of population (eg) Kashmir Also <u>affecting</u> tourism & industries.

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measures to tackle

(1) money laundering – PMLA ⇒ tries to use financial institutions to stop the trail & lead to point zero.

(2) NIA 2008 – special body to deal with terrorism & organized crime under UAPA 1967

(3) covert operations – by Indian armed forces
  (5) Balakot strike, Op. Sindoor etc

(4) socioeconomic development of people - to prevent recruitment

(5) control logistics & communications
  (i) surveillance over social media & messaging
  (ii) all transport modes – patrolling

(6) Political – international consensus on terrorism & joint ops to prevent such crimes
  (i) Army exercises, etc

(7) Diplomacy – to curb the supply chain – diplomatic talks with major countries
  (i) Golden triangle – myanmar, Vietnam & Laos

Feedback
(For OFFICE use only)

#	G	A	P
AWIS			
CD & VA			
S & F			
P & R			

Please put tick marks in the above table.
Here G is Good, A is Average and P is Poor.

TOTAL MARKS	

Q.18) A range of interventions has led to improvement in the security situation in the North-East region of India, but several impediments to lasting peace still remain. Analyse. (15 Marks, 250 Words)

विभिन्न हस्तक्षेपों के कारण भारत के उत्तर-पूर्वी क्षेत्र में सुरक्षा स्थिति में सुधार हुआ है, लेकिन स्थायी शांति के लिए अभी भी कई बाधाएँ बनी हुई हैं। विश्लेषण करें। (15 अंक, 250 शब्द)

North East India, due to its undulating topography, has developed niches of culturalism, leading to high diversity & thus affecting identity leading to security challenges like insurgencies. &

 • cessationist demands

Range of Intervention

(1) 6th schedule - giving political autonomy & self rule

(4) Dima hasao, Karbi Anglong

Fig 18. - NE Region & Security
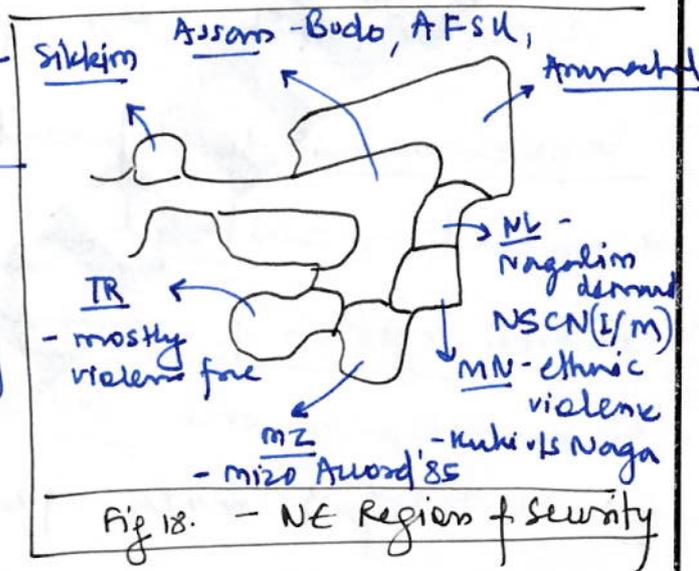
(2) Accords with insurgent groups.
 (5) Mizo Accord -
 (6) Bodo Accord -

(3) Security - deployment of forces
 BSF - Tripura, Meghalaya
 AR - Myanmar borders
 Indian Army - elsewhere

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(4) Legal measures

    (a) AFSPA 1958 - powers to army with impunity for search, seizure & arrest.

    (b) UAPA 1967 + NIA 2008 - to hold the groups acting against India's sovereignty & maintain peace

(5) Developmental:

    (a) Dept of NE Region (DONER) → for any kind of development

    (b) Reservation, KV, Prevention of Atrocities etc

┌─────────────────────┐
│ several impediments │
└─────────────────────┘

(1) Conflicts - between ethnic groups
    (eg) manipur - Kuki r/s Naga r/s Meiteis

(2) External support - of Pakistan, China & other non-state actors like LeT, HeM

(3) Money laundering - using new tech like Crypto. for smuggling of drugs, guns & FICN.

(4) Drug cartels - from Golden triangle of SE Asia

(5) High distrust to constitutional measures.

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(6) Cultural diversity. Lack of unified regionalism

(7) Lack of industrial development - due to terrain etc.

> Steps to be taken

(1) Tourism & food processing industry,
  - (i) Guwahati as hub & other smaller towns & as clusters
  - (ii) Horticulture — huge scopes
    - (3) meghalaya — Banana
         Tripura — pineapple

(2) Further expanding 6th schedule - to give autonomy within the constitution

(3) Armed forces - population relation be developed
  - (3) op. Sadbhavna of Kashmir. — to build trust.

(4) cutting down on many landering, smuggling rackets & illegal resources like rathole mining.

(5) Participatory development — of social, healthcare & other infrastructure

  & Look East & Act east are steps to integrate NE India into regional economy

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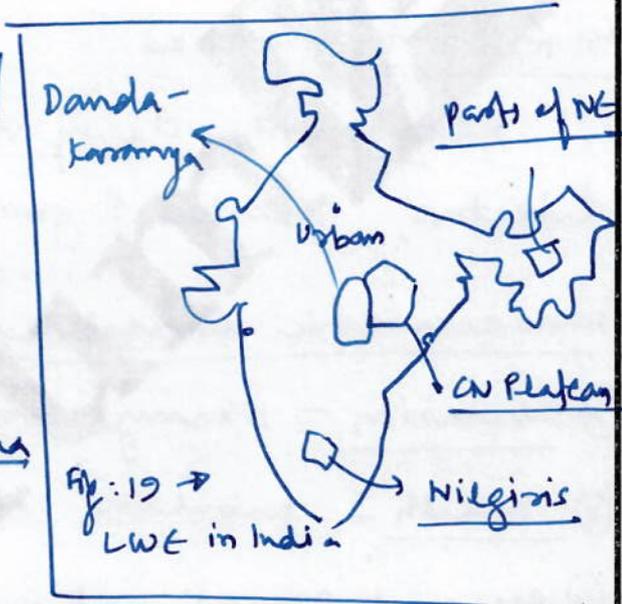Visit us : www.forumias.com
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Q.19) Examine the reasons for continuation of Left-Wing Extremism (LWE) in certain parts of the coun-
try. Also suggest multi-pronged strategy to tackle the menace of LWE.   (15 Marks, 250 Words)

देश के कुछ भागों में वामपंथी उग्रवाद (LWE) के जारी रहने के कारणों की जांच करें। वामपंथी उग्रवाद के खतरे से निपटने के
लिए बहुआयामी रणनीति का सुझाव दीजिए।   (15 अंक, 250 शब्द)

LWE has reduced from   to
in last 10 years. ⊙ Yet, it is prevalent in
certain regions. (ɛɔ) Bastar, Damtewada . ⤓

Reasons for continuation

(1) Deforestation - by
non-tribals, leading to
loss of livelihood
(eg) Bhilb - MFP of Mahua
& Tendu leaves

Dandla-
Karamya ←
                    parts of NE
            Urban
                    CN Plateau
Fig : 19 →
LWE in India   → Nilgiris

(2) Encroachment on land - by Real Estate &
Industries. (eg) Niyamgiri hills - Vedanta Plant

(3) Lack of development - (eg) Bastar region - still
very backward

(4) socio-economic disparity - from other regions

(5) social & Human Index - very low - (eg) HDI of
                                          0.58.

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Multipronged strategy needed

(1) SECURITY

   ↳ to enhance the capacity of forces

    (i) Security related expenditure (SRE)

    (ii) New police stations

(2) Protection from attacks

    ↳ equipments, decoy vehicles, mine detectors, missiles & guns, night vision radar

(3) socio economic development -

    (a) Education — Eklavya schools

    (b) Health — Ambulance, institutional delivery

    (c) Regional Development - ADP, ABP etc

(4) Economic

    (1) Development of Agriculture like horticulture, agroforestry, etc

    (2) market for MFP sale - eg TRIFED initiation

    (3) Industries — to become growth poles with trickle down effect.

(5) <u>Cultural</u> - preservation of language,
   * local culture, cuisine, etc

   (e) <u>Bhashini</u>, etc → using AI

(6) <u>Political</u> - bringing them under local
    administration with autonomy.

   (e) PRI → <u>PESA</u>

   (e) Autonomy of 5th & 6th schedule

(7) <u>Legal</u> - for legal <u>aid</u> & representation
   ↳ <u>document & clearance of FRA 2006</u>
   ↳ help resolve & return encroachment by
   non tribals

(8) <u>Cutting funding</u> - by reducing their sources of
    income - <u>urban naxal funding</u> — NSA
    <u>Foreign funding</u> — FCRA
    <u>money laundering</u> — PMLA. etc.

   Thus, the strategy of <u>SAMADHAN</u> aims to
bring all of this into practise to resolve the
challenge of LWE.

Q.20) An effective border management strategy hinges on the dual pillars of fortified security infra-structure and the socio-economic development of border communities. Discuss, with initiatives taken by the government in this regard.
(15 Marks, 250 Words)

एक प्रभावी सीमा प्रबंधन रणनीति सुदृढ़ सुरक्षा अवसंरचना और सीमावर्ती समुदायों के सामाजिक-आर्थिक विकास के दोहरे स्तंभों पर निर्भर करती है। इस संबंध में सरकार द्वारा की गई पहलों पर चर्चा करें।
(15 अंक, 250 शब्द)

India's neighbourhood consists of unstable polities & enemy states. Border management becomes key for National Security

Fortified security Infra

(1) Border roads & connectivity to reach last mile on the border

(2) Integrated check posts - to provide for secure movement of people

(3) Proper fencing - to prevent illegal migration, smuggling, drug Transfer etc

(4) Use of technology - like radio radars, night vision etc

(5) Combination of human + machines - smart AI to detect any intrusion

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socioeconomic development

(1) Refuge areas - with low socioeconomic development, chances of losing the identity of people - leading to friction (eg) Kashmir

(2) 3. Social development - building schools & colleges, hospitals, PHCs etc to cater to health needs.

(3) Regional development - with a pioneer industry, followed by trickle down to form regional economic integration

(4) cultural preservation - border regions have special cultures that require protection.
(eg) Kashmir, Punjab, entire NE India.

(5) Infrastructure - for development of other sectors (4) supporting infra -

(6) Bringing them to mainstream - (eg) Majid - a former terrorist brought to mainstream by rehab program

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Initiatives

security	socioeconomic
① CIBMS - on Indo-B'desh border- smart system to detect any movement	① Security & rehab- op. Sadbhavna-
② Shekatkar committee- ↳ comprehensive technology use	② PHCs & primary schools - run by KV, Navodaya
③ Madhav Godbole - for infrastructure & security rearrangement	③ Political participation- Autonomy under 6th schedule
④ fencing - almost completed on Pak & B'desh borders	④ Bodoland Territorial Region
⑤ Chardham, DBO road- by BRO -	④ social sectoral development - - Agri, Horti, Animal husbandry - Industries - Tourism
⑥	⑤ Regional development- - BADP.

As per ARC2, a secure border will help
in regional development without fear of
external influence

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Mentor Feedback Questions

1 ....
2 ....
3 ....
4 ....
5 ....

Test Goal

1 ....
   .... ☐

2 ....
   .... ☐

3 ....
   .... ☐

Outcomes

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Marking Scheme

| Mark	Good	Average	Below average
10 Marker	3.75 – 5.0	3.0 – 3.5	< 3.0
15 Marker	5.75 – 7.0	4.0 – 5.5	< 4.0
20 Marker	7.75 – 10	6 – 7.5	< 6
✔	Key / Relevant Point		
✖	Vague / Irrelevant		

* Subject to change without prior notice.

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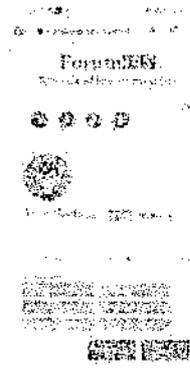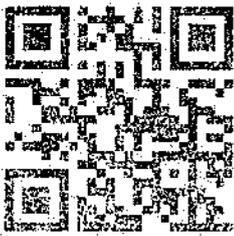
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