TEST CODE	7	1	3	2	5	2

Time Allowed : Three Hours
समय : तीन घंटे

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Maximum Marks : 250
अधिकतम अंक : 250

GENERAL STUDIES / सामान्य अध्ययन

Name Of Candidate परीक्षार्थी का नाम	Mohit Agrawal		
Roll No./अनुक्रमांक	19100392560	Medium/माध्यम	English ✓ हिंदी ☐
Center Code/परीक्षा केंद्र	FRC.	Date/दिनांक	31/07/2024

*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. प्रसं.	Max. Marks अधिकतम अंक	Marks Obtained प्राप्तांक
1		
2		
3		
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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 या 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 हैं, 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 उसके 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।

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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 anything
in this Area / इस स्था
पर कुछ न लिखें)

Q.1) Aditya L1 mission is an important milestone as India's first space based solar observatory. Enlist the major scientific objectives and the challenges of the mission.   (10 marks, 150 words)

आदित्य L1 मिशन भारत की पहली अंतरिक्ष आधारित सौर वेधशाला के रूप में एक महत्वपूर्ण मील का पत्थर है। मिशन के प्रमुख वैज्ञानिक उद्देश्यों और चुनौतियों को सूचीबद्ध कीजिए।   (10 अंक, 150 शब्द)

[Aditya L1] is the first national space mission to observe 'sun' and its 'characteristics & behaviour

It is the solar probe, placed at lagrange point 1, which is in direct view of 'sun' all around its life.

4 → lagrange point
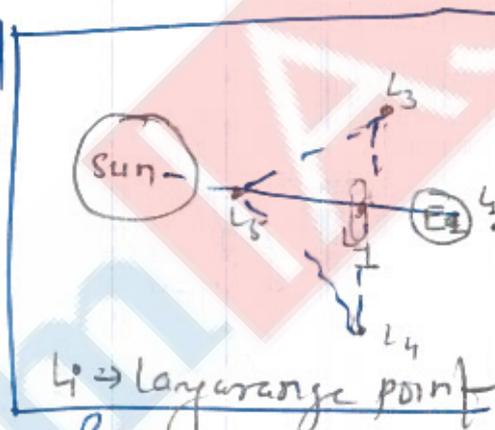
[L1] signifies that gravity of both sun and earth is at equilibrium at this point; leading to its stability.

\# [Scientific objectives] →

→ • To identify the various heleocentric phenomenon ↔ solar cycle, eron q

• To understand the origin of universe and earth

3 To understand the various processes in galaxy and universe and find out earth like planet

• To understand the behaviour and affect of 'Solar cycle' on earth's geographical and cosmetic phenomenon.

Significance → ① Spill over and spin off effect on other field (particle physics, quantum mechanics)

→ ② To generate interest of youth on space exploration

③ will pave way for private sector. (INSPACE.)

→ ④ Raise India's influence on the world.

Challenges → ① 'Sun's temperature' and withstand it. (Scientific shield needed)

② Communication is not real time.

③ Cost is very high (India's space Budget is ~ 18000 cr)

④ Lack of international Technology transfer.

Aditya L1 is the beacon of India's space exploration, will pave ready for more such in future.

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Q.2) Describe briefly what gene therapy is and what advantages it has over other treatments?

(10 marks, 150 words)

संक्षेप में जीन थेरेपी का वर्णन कीजिए और अन्य उपचारों की तुलना में इसके फायदों को सूचीबद्ध कीजिए?

(10 अंक, 150 शब्द)

Gene therapy is the mutation, modification and editing of genes to remove certain traits or introduce certain traits : eg. CRISPR Cas 9 via modification in DNA Code.

Advantages :-

① 'highly reliable' as organic transformation is being done,

② Food security → Green revolution of India ⇒ Self sufficiency (monsanto's lemma roro) which other technology could not do.

③ "Scalable" from lab to the field unlike others.

\# However, there are certain challenge

① 'ethical concern' of Bias of the scientist ⇒ undesirable consequences & designer Baby

② against the law of natural succession

③ may lead to threat to Biodiversity (ms. swaminathan) L (Gm Crops)

④ ' It is a double edged sword, effective regulation is need with be reaping full benefits of it .

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

Q.3) With recent advances in technology, robots are now equipped to perform more than just conventional and routine tasks, which brings new opportunities as well as risks. In this context, evaluate the future potential of the robotics sector. (10 marks, 150 words)

प्रौद्योगिकी में हाल की प्रगति के साथ, रोबोट अब पारंपरिक और नियमित कार्यों से कहीं अधिक करने में सक्षम हैं, जो नए अवसरों के साथ-साथ जोखिम भी लाता है। इस संदर्भ में रोबोटिक्स क्षेत्र की भविष्य की क्षमता का मूल्यांकन कीजिए।

(10 अंक, 150 शब्द)

'Robots' are automatic mechanized machines which behaves like a ~~autom~~ autonomous body/system. With advent of _AI_, machine/~~~~ the [Robotics] has become more sophisticated.

[New opportunities] : The ROBOTS : Potential

1) <u>Agriculture science & engineering</u> → Precision farming, agriculture survey (drones), irrigation (water guns), supply chain automation (harvester)

2) [Health] → Robotic surgery, recently performed for mental health patient of sms

3) [Governance] → Surveys (GIS based, remote sensing), delivery of services (nano drones)

4) [defence] → hybrid warfare by targeting enemy hideouts (Akash missiles)

(5) 'Scientific exploration & research' :- Underwater, space exploration (Curiosity rover on MARS) However, risks are also multifold :-

(1) algorithmic bias leads to threat to national security, social cohesion.

(2) employment loss due to automation eg. Future of Job report (WEF)

(3) Technological monopoly and leading to inequality.

(4) hybrid / 5th Generation warfare recent attack on Poonch airbase by drone.

(5) safety concern : acting against human eg :- robotic arm killed a man while working due to malfunction.

future Polyeshy → is immence, but its benefits needs to be balanced with

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पर कुछ न लिखें)

Q.4) Private participation in propelling India's space journey is widely acknowledged but is yet to be fully tapped. In light of the statement, analyse the hurdles faced by the private sector and also recommend measures to unlock greater private participation in the space economy.   (10 marks, 150 words)

भारत की अंतरिक्ष यात्रा को आगे बढ़ाने में निजी भागीदारी को व्यापक रूप से स्वीकार किया गया है लेकिन अभी तक इसका पूरी तरह से दोहन नहीं किया गया है। कथन के आलोक में, निजी क्षेत्र के सामने आने वाली बाधाओं का विश्लेषण कीजिए और अंतरिक्ष अर्थव्यवस्था में अधिक निजी भागीदारी को प्राप्त करने के उपायों की भी अनुशंसा कीजिए।   (10 अंक, 150 शब्द)

India's space sector is Just 2% of world's $400b space industry. Atmanirbhar Bharat also encourages private sector involvement in space sector. (~120 startups) — (MoS data)
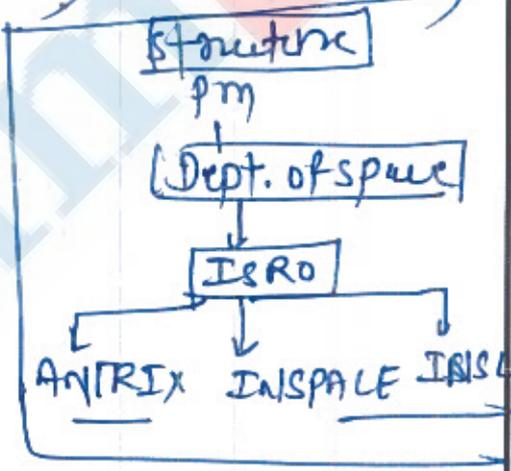
Few success story :-

① Own space vehicle 'Skyroot space', 3D printed — CBE

② Privately owned satellite launch

③ ancilliarisation of equipment for ISRO.

Structure
PM
↓
Dept. of space
↓
ISRO
↓
ANTRIX   INSPACE   INSL

However, hurdles are there →

① funding : Government budget is around a tenth of US' (NASA), lead little scope of 'extention support' and lead handholdr

② Data leak and strategic challenge): as space is 4th zone of warfare, could potentially lead to leakage of official secrets

③ Skilled manpower — educational institutes hardly has Aerospace engineering as discipline

④ Improper Infrastructure → deter private players .

⑤ monopoly of ISRO idea (Natural)

⑥ There is dire need to open this sector for private like country's like USA (SPACEX, Virgin atlantic)

Measures

→ ① raise expenditure & funding .

→ ② Collaborations of ISRO-SPACEX- Indian startup)

→ ③ handholding & technological support (Inspace)

→ ④ Improve IPR regime (IPR Policy 2016)

⑤

Space is the space to be in

—pm modi

Q.5) Write an explanatory note on the causes and impacts of avalanches. Also, highlight the various strate-
gies to mitigate its impact, with a special emphasis on NDMA guidelines.   (10 marks, 150 words)

हिमस्खलन के कारणों और प्रभावों पर एक विवेचनात्मक टिप्पणी कीजिए। साथ ही, NDMA दिशानिर्देशों पर विशेष बल देते
हुए इसके प्रभाव को कम करने के लिए विभिन्न रणनीतियों पर प्रकाश डालिए।   (10 अंक, 150 शब्द)

Avalanches are the rock, pieces &
debris of ice falls under the influence
of gravity. It is a 'ice-landslide'

Causes

Natural → frequent snow
fall (greenhimalya as),
Steep slope (slope failure), rise of
temperature (leads to thawing) Tectonics
(himalyan plate)
manmade → destabilization of slopes
(unbridled development), climate change
(extreme temperature)

(Avalanche
prone
region)

Impacts

① causes death and loss of human capital
② disrupt life and (livelihood) due to
   'economic disruption' eg: Tourism Industry
③ Agriculture, and other economic

activities also affected.

③ Trauma and other health problems due to disaster. [Preventive]

Strategies needed

→ ① cheek development - based on feasibility, + EIA (mishra committee)

→ ② Slope stabilisation (lining)

→ ③ [mitigation]

→ early warning system

→ Avalanche Atlas (ISRO)

frequent monitoring.

[Bottoms up approach w.rt. NDMA guidelines]

→ (a) Voluntary Community formation

→ (b) disaster resistent infrastructure

↳ (c) check unbridled tourism.

[Avalanches] are the part and parcel of hilly ~~regions~~ regions, but their hazard & vulnerability should not lead to disaster.

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Q.6) Technology plays a multidimensional role in augmenting the disaster management apparatus of the country. Discuss. Also, bring out the measures needed to enhance the usage of such technologies in managing disasters. (10 marks, 150 words)

देश के आपदा प्रबंधन तंत्र को बेहतर बनाने में प्रौद्योगिकी एक बहुआयामी भूमिका निभाती है। चर्चा कीजिए। साथ ही, आपदाओं के प्रबंधन में ऐसी प्रौद्योगिकियों के उपयोग को बढ़ाने के लिए आवश्यक उपाय सुझाए। (10 अंक, 150 शब्द)

As civilisation is growing, disasters are also becoming new normal. Role of Technology, therefore becomes indispensible.

Disaster (DM act, 2005) are the occurrence which happen suddenly and bring calamity in the normal happening of life. eg 2015 Nepal Earthquake

Prevention → mitigation → Preparation ← Pre-disaster

Recovery   Response   post

(Rehabilitation)
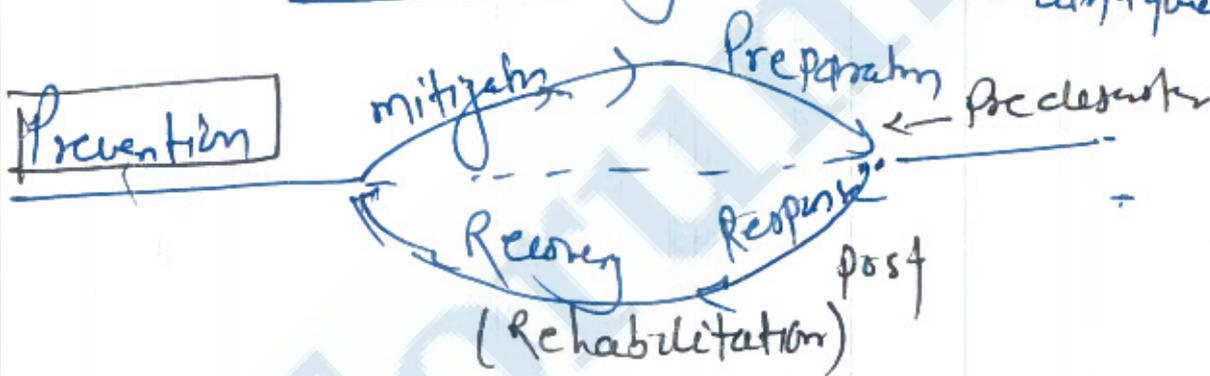
Stages of disaster

① Prevention stage → (a) earthquack resistance Buildings (Building Code IS:1893).

ⓑ Feasibility test before settlement or industrial development (EIA, EPA, 1986)

ⓒ "Slope stabilisation" - (Lining technique) to prevent landslides, avalanches.

ⓓ Cloud seeding (To prevent drought) eg. UAE

ⓔ Bypass canal (Civil Engineering) to mitigate flood

② |Mitigation & Preparce| → Creation of Social media network, Formation of cadre to tackle disaster (Satellite based, Life Boats)

- Provision of Ready food (Precooked Processed)

④ |Response| → ° Use of drones, helicopters in rescue

- Use of digital technology for co-ordination

⑤ |Post trauma recovery| → video conferencing telemedicine, (Mental health, Illness)

- Use of medicine, vaccines etc.

- Ready made (3D Printed structures/ shelter)

|Technology| could be a catalyst in disaster response and must be leveraged.
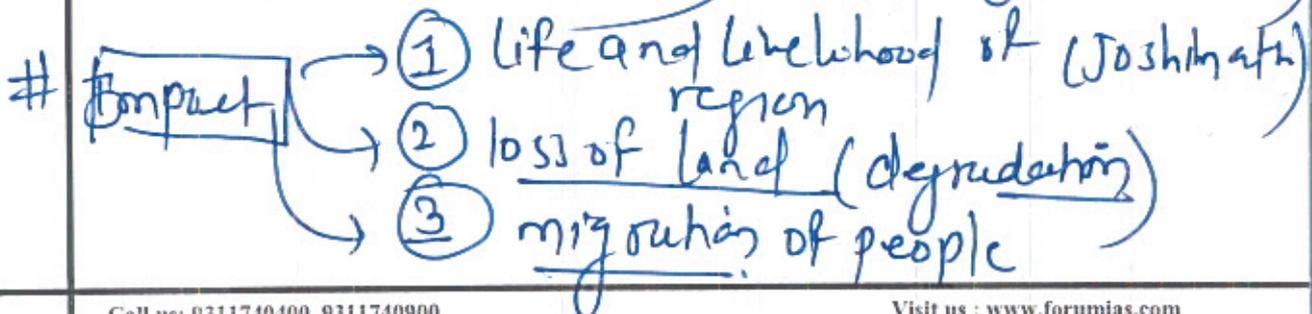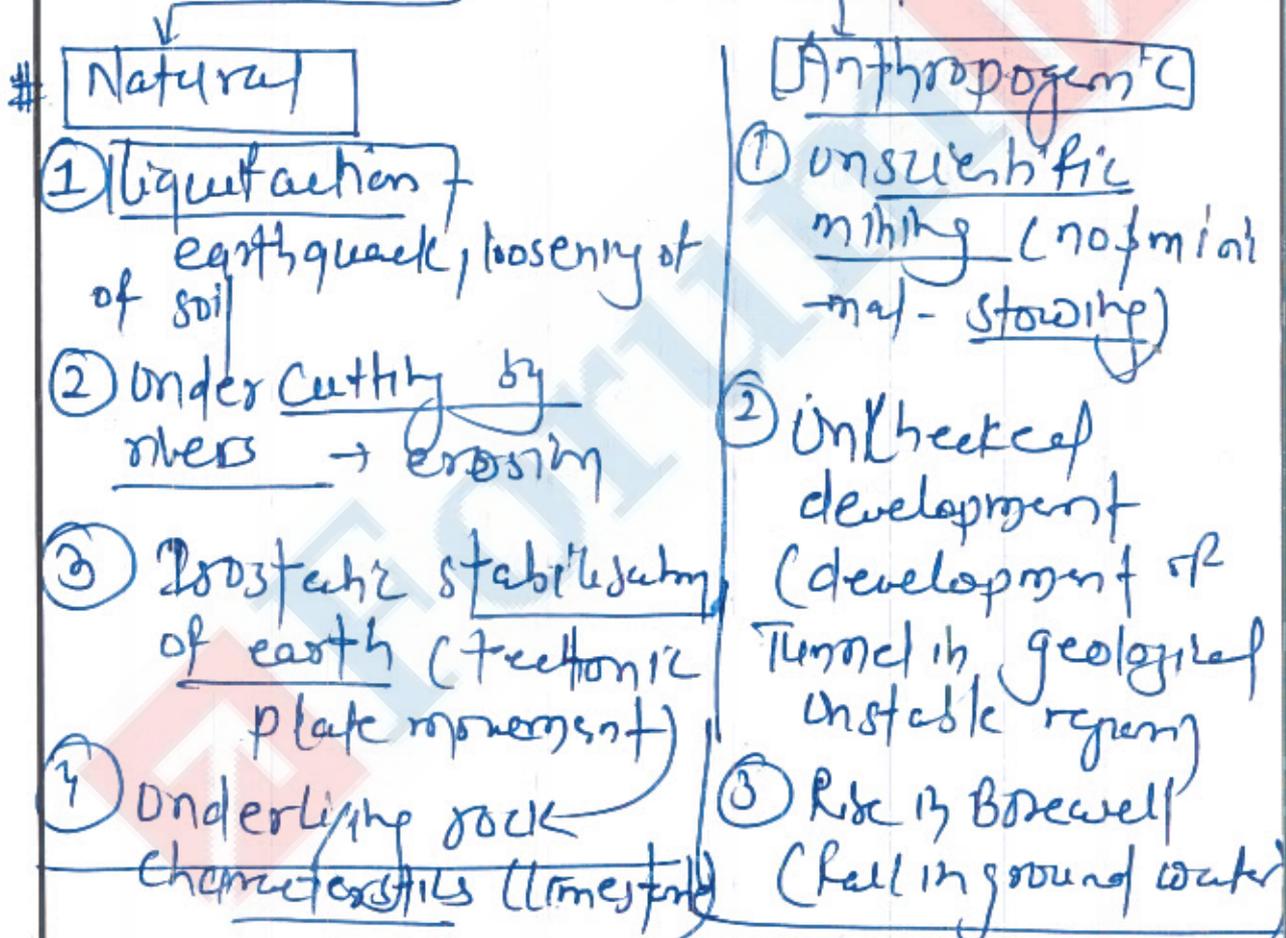
Vice President (Ex)

Q.7) Discuss the natural and anthropogenic factors behind incidents of land subsidence. Suggest counter-measures to contain such incidents. (10 marks, 150 words)

भूमि अवतलन/भू धँसाव की घटनाओं के पीछे प्राकृतिक और मानवजनित कारकों पर चर्चा कीजिए। ऐसी घटनाओं को रोकने के लिए निरोधात्मक उपाय सुझाएँ। (10 अंक, 150 शब्द)

Land subsidence is sagging of earth surface due to natural or man-made factors.
eg: mining subsidence, Sikyara Tunnel (2023)

Factors Responsible

 # Natural

① liquifaction + earthquake, loosening of soil

② Under Cutting by rivers → erosion

③ Isostatic stabilisation of earth (tectonic plate movement)

④ Underlying rock characteristics (limestone)

Anthropogenic

① Unscientific mining (no of mineral mal-stowing)

② Unchecked development (development of Tunnel in geological unstable region)

③ Rise in Borewell (fall in ground water)

 # Impact
→ ① life and livelihood of (Joshimath) region
→ ② loss of land (degradation)
→ ③ migration of people

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पर कुछ न लिखें)

MEASURES · NEEDED , ∴ while natural

① factors are hard to control, but their
vulnerability could be reduced.

— via "Geological survey" (Geophysical testing)
and "civil engineering techniques (Japan's Jacket system)

② for manmade

↳ Ⓐ Responsible development ;
with adequate rehabilitation & reclamation
(MMDR act, 2015), aforestation .

Ⓑ "Scientific mining" with proper "Roof Control"
eg :- longwall caving

Ⓒ Check on rising "Borewells"

For this context, mishra committee and
Gadgil Committee recommendatn to be
followed with mitigation via NDMA
guidelines ⟹

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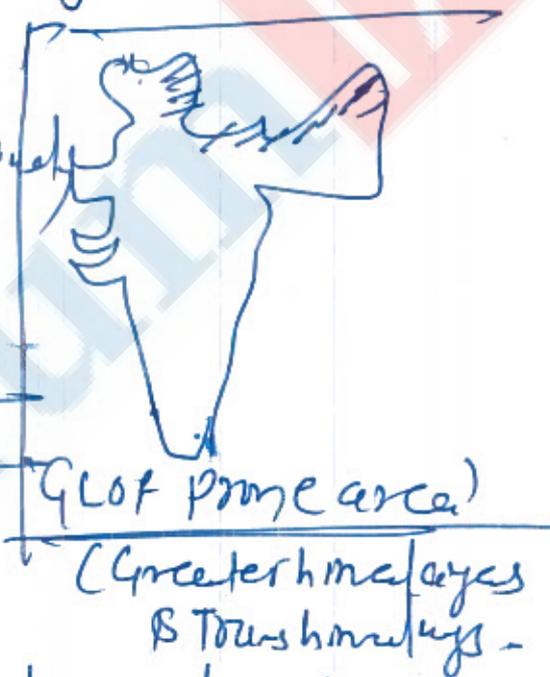Email : helpdesk@forumias.academy
14

Q.8) Explain Glacial Lake Outburst Flood (GLOF). Also, discuss GLOF mitigation strategy with special reference to National Disaster Management Authority (NDMA) guidelines. (10 marks, 150 words)
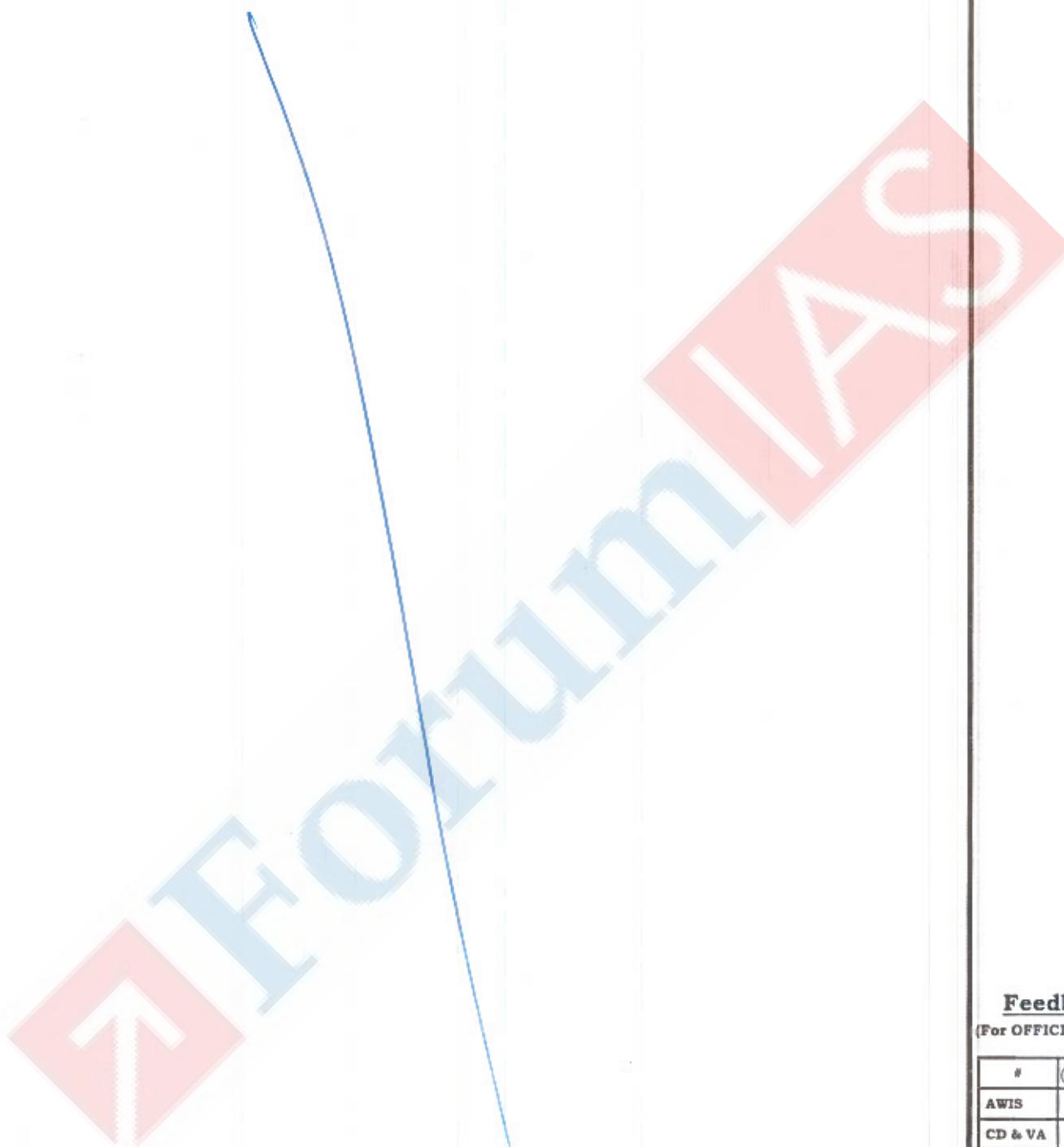
ग्लेशियल लेक आउटबर्स्ट फ्लड (GLOF) का वर्णन कीजिए। साथ ही, राष्ट्रीय आपदा प्रबंधन प्राधिकरण (NDMA) के दिशा-निर्देशों के विशेष संदर्भ में GLOF शमन रणनीति पर चर्चा कीजिए। (10 अंक, 150 शब्द)

'Ghof' is the a sudden outpour of glacier lake that floods the region around. eg Uttarakhan's Chamoli glacier.

① NDMA has issued guidelines to effectively mitigate its negative repurcussions

(GLOF prone area)
(Greater himalayes & Transhimalayas.

① Check on unbridled development with regular planning

②

②

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in this Area / इस स्था
पर कुछ न लिखें)

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in this Area / इस स्थ
पर कुछ न लिखें)

Q.9) National security challenges require sufficiently addressing the concerns of human security. Explain and suggest reforms for the same. (10 marks, 150 words)

राष्ट्रीय सुरक्षा की चुनौतियों का प्रभावी समाधान मानव सुरक्षा की चिंताओं को पर्याप्त रूप से संबोधित किए बिना संभव नहीं है। इस विषय पर विस्तारपूर्वक चर्चा करें और इसके लिए सुधारात्मक उपायों का सुझाव दीजिए। (10 अंक, 150 शब्द)

National security is maehtaehlng Unity, sovereignity and integrity of country with sufficient [Human & social security].

Human security

- [No poverty (415%.)
- equitable society (4 min 85)
- Human resource development
- Social Cohesion] (>50% unemployable) !!

(Territorial integrity)
⇒ · democratic sovereignity

[National security]

inequality | Social polarization) | disunthitom | Unemployment

poverty   Juvenile delinquency)
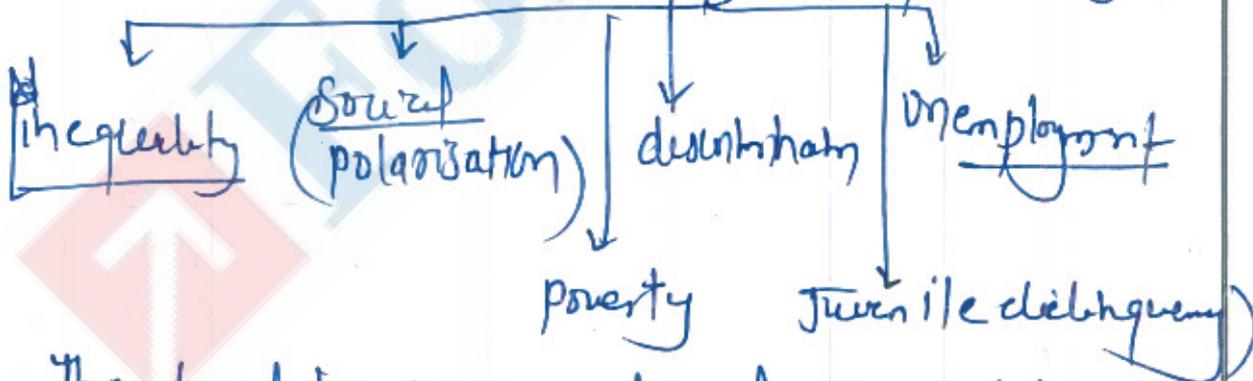
They lead to unconventional degradation of a nation (as happed in Pakistan & middle east)

Therefore, to tackle national security, these must be handled :-

Reforms
Need
(multifront)
Constitutional
Morality

→ ① Inclusive growth : (aspirational distriet/Block programme, DONER

→ ② Human Capital formation — (Values scientific ⇒ Productivity temper free medical faculty)

→ ③ Create Condition for employment (Northeast 420%)

④ Balanced regional development (Special Category status, Finance commission)
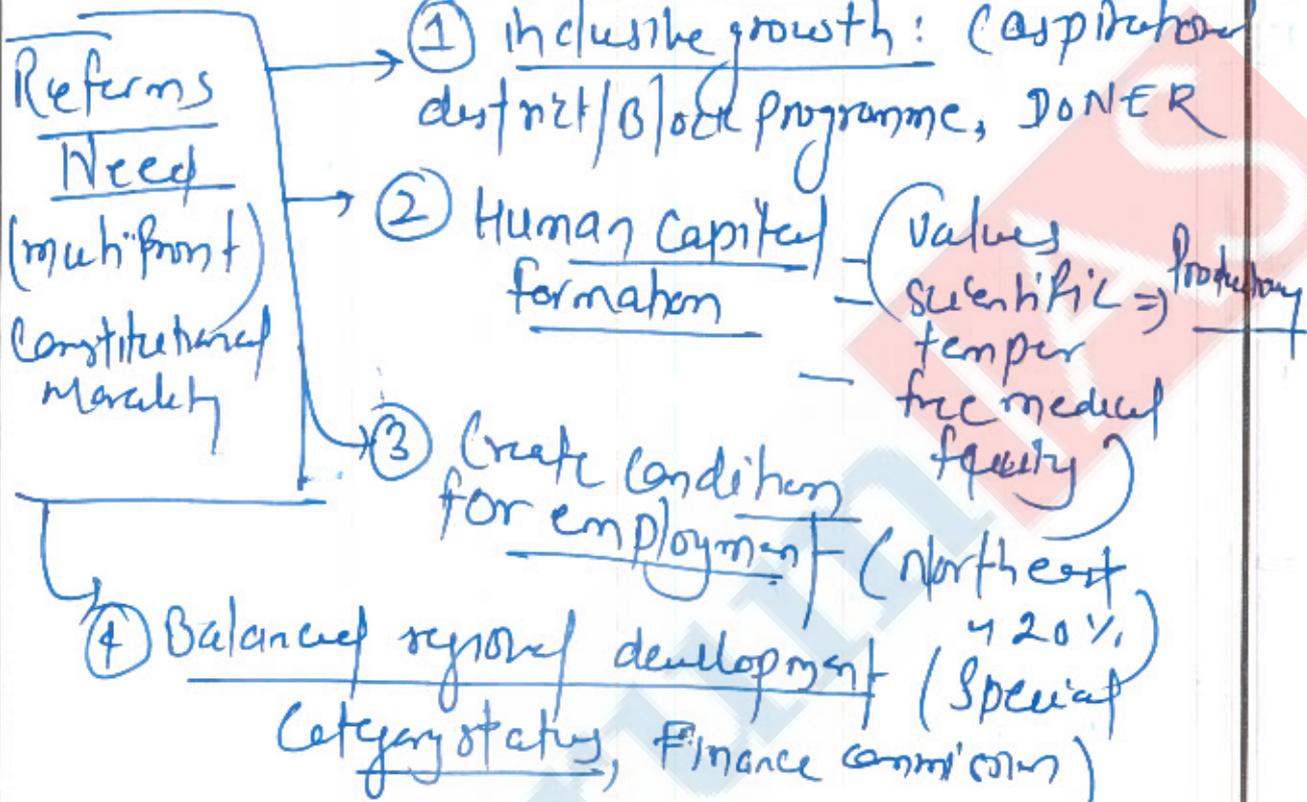
However, other factors are also requested :-

→ (a) Soft and hard power diplomacy = smart diplomacy

→ (b) Nation's economic growth (5th largest)

→ (c) Technological advancement :-

If [human security] is attained, national security is just a By product.

[NSA Doval]

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Q.10) Outlining the various cyber threats faced by India, assess the state of the country's preparedness to deal with the same. (10 marks, 150 words)

भारत को प्रभावित करने वाले विभिन्न साइबर खतरों का विस्तृत विश्लेषण करते हुए, देश की इन खतरों से निपटने की क्षमता का आकलन कीजिए। (10 अंक, 150 शब्द)

Cyber threats are the Computer based threat which can overwhelm the digital realm and critical infrastructure. eg: recent WazirX ($200mn stolen)

Various threats

→ ① Cyber espionage by stealy official secrets eg Stuxnet, (Kudankulam nuclear plant by china 'D-Track' attack)

② Cyber Phishing → To steel critical personal information eg ~~phishing~~ pegasus

③ Skimming → through Cloning of cards

④ Ransomwares and frozens to overhelm the data and system eg! wanna cry.

⑤ digital arrest - falsely make people believe that they have committed something wrong ~

⑥ Cyber spoofing - Sexting, honeytrapping

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⑦ Juice Jacking, Man in the middle attack

As per [CERT In], the cyber attack has increased exponentially in recent times.

Threats — ① Financial frauds ($1500cr)

② national security (destabilisation & deep fakes)

③ Social Cohesion (2020 riots delhi)
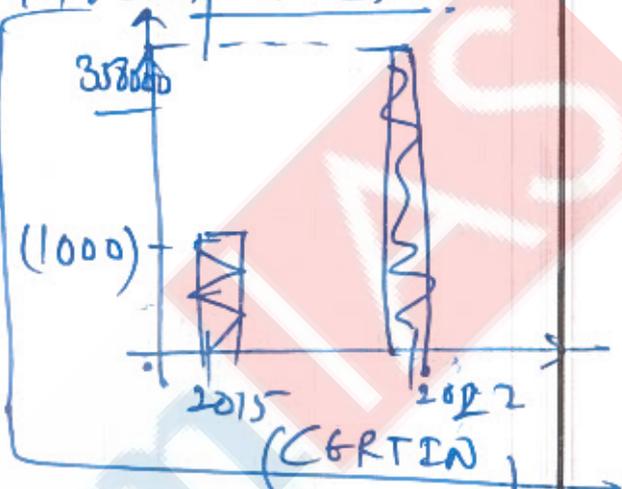
(CERT IN)

Preparedness —

① national cyber policy to deal with threats with Cyber crime control centre, cert In.

② Research & development in newer technology (Quantum encryption) — Nation mission

③ Collaborative approach — with industry and academia and with global players

④ Sensitisation of police force and shared intelligence (NATGRID)

Cyber is the 5th generation of warfare, is like a double edged sword

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Q.11) Explain how the geographical location of India makes it extremely vulnerable to the menace of drug trafficking. What are the various internal security threats posed by drug trafficking? (15 marks, 250 words

भारत की भौगोलिक स्थिति इसे किस प्रकार ड्रग तस्करी के लिए एक अत्यंत संवेदनशील क्षेत्र बनाती है? ड्रग तस्करी के कारण उत्पन्न होने वाले आंतरिक सुरक्षा के विभिन्न खतरों का विस्तारपूर्वक विश्लेषण कीजिए। (15 अंक, 250 शब्द)

India is situated on 'arc of instability' and 'arc of drug trade' with surrounded through "Golden Crescent" and "Golden triangle".

\# 'Extreme vulnerability'

① Porous border on the eastern side

② illegal migration (unchecked) (Bangladesh, Myanmar — NE)

③ destabilised economy of neighbours
→ drug trade is one of the important source of income (Taliban, Myanmar Junta) wide

④ Open maritime Border ~ 7500 km long coast line that too in international sea lanes of Communion with piracy (Somalia)

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

⑤ Rise of demand for various drugs in
recent times; (eg: hashish, marijuana,
heroine among youth) ≡ 'Udta Punjab'

⑥ hostile neighbour': like china and
pakistan — 'Proxy war' to destablise
India's social and human Capital

| DRUG TRAFFICKING : A THREAT
                            TO
                        INTERNAL
                        SECURITY

① Destablishy economy + parallel
economy (black marketing, money laundery,
fake currency)

② destablise the demography and
disorientes the demographic
dividend (>65%. are < 35yrs)

③ Political and social polarisation
as rationality of thought is
lost. ⇒ social instability ⇒ insurgency

④ vicious cycle of poverty and unemployment exaggerated due to ~~continous~~ low productive life and poor educational outcome ⟹ fuel insurgency, intolerance, radicalisation eg North east violence (Manipur)

|Measures needed|

↪① Fencify the Borders (smart lasers, Use of IoT based sensors) (BOLD-QIT, Bangla)

↪② Thorough security checks at international checkpoints (frisking measures) Arry

↪③ International collaboration and para diplomacy? (operation All clear of Bhutan)

↪④ Trust Building and awareness generation (J.S. Verma Committee)

↪⑤ equitable and growth (SDG 2030)

---

drug trafficking is not just a menace for the society, but for the humanity ft degrades a nation.

Q.12) Discuss the socio-economic impact of new developments in science and technology in India since independence. (15 marks, 250 words)

स्वतंत्रता के पश्चात् भारत में विज्ञान एवं प्रौद्योगिकी के नवीन विकासों के सामाजिक और आर्थिक प्रभावों का वर्णन कीजिए।
(15 अंक, 250 शब्द)

India inherited too little in terms of 'science prowess' from Britishers, except railways and coal mining.

Since 1947, we have made huge strides. ∴

① Technology	Socio-economic Impact
① Biotechnology in agriculture and health.	→ Green revolution ⇒ self sufficiency in food grains ⇒ Poverty reduction ⇒ food security • Prevalence of Generic vaccines (Pharmacy of the world) → low out of pocket expense
② Nuclear technology (Power plants) • Atomic Bomb B	• energy security → Socio-economic development • national security

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③	Space science and various Space missions	• Sense of pride (we are on the Moon) • ✪ Global standing of India • Technological advancement ⊃ Television (GSAT) → GAGAN (regional navigation
④	Industrial growth	- equitable regional growth → Bhilai, raurkela steel plants → local upliftment
⑤	'e-Governance' ⇒ (reduce leakage) ⇒ minimum government & maximum Governance	→ last mile connectivity (reach) → voice to the voiceless → resource use efficien = more welfare
⑥	Telecommunicati	• Social media → movement (#metoo)

	Internet earnings eg' Youtubers, Ticktokers.
⑨ Nanoscience	→ food fortification
	→ naho materials (OLED TV)
	⇒ improved quality of life

India is Continuously moving ahead in Science not only domestically, but globally. It is the front runner and eminent forefathers like Dr. Bhabha, Swaminathan are the pioneers of that chere.

Bharat of '2047' would be a advanced Bharat and a Superpower India based on this technologized heft ~

Q.13) 5G technology is a breakthrough that finds applications across diverse sectors. Elaborate. How is 5G technology different from its predecessor? Also, list the various challenges associated with its effective rollout. (15 marks, 250 words)

5G प्रौद्योगिकी एक अभिनव तकनीक है जिसके अनुप्रयोग विभिन्न क्षेत्रों में पाए जाते हैं। विस्तारपूर्वक बताएँ। 5G प्रौद्योगिकी अपने पूर्ववर्ती से किस प्रकार भिन्न है? साथ ही, इसके प्रभावी कार्यान्वयन से जुड़ी विभिन्न चुनौतियों को सूचीबद्ध कीजिए।
(15 अंक, 250 शब्द)

'5G' is a 5th generation mobile telecommunication technology, which totally overhauled the advantages of its predecessors for something phenomenal. It is a leap-frogging tech.

$$1G \longrightarrow 2G \longrightarrow 3G, 4G$$

1G	2G	3G, 4G
only call	Call + sms + slow internet (10-15 KBPS)	Call + sms + internet based call but slow internet
- frequent call drops		

ISSUES — (low reliability, high cost, slow speed)

5G is the breakthrough →

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5G → ① [Ultralow latency] (<5ms)
↳ Faster Communication ⇒ real time
→ [Expert Systems] (self driving cars, IOT)

② [Network Slicing] – allows multiple stand alone networks ⇒ reduce cost of doing Business and improves quality of life .

③ [high frequency] and stable connection.
high [Bandwidth]

④ [Very highspeed] upto 20 GBPS
⑩ (more than 10 times of 4G)

[Significance] → real time applications (zoom,,)
→ Governance (automatic toll collection)
→ Self driving car
→ online examinations
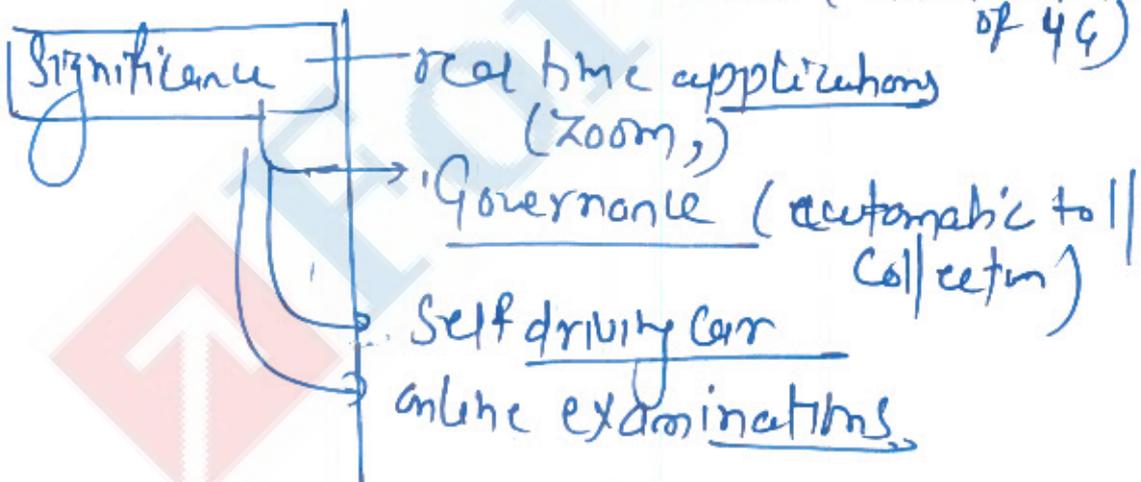
However there are . Certain —
[Challenges] —→.

(1) multiple mobile towers required to form a stable network due to high <u>frequency</u> and <u>low wavelength</u>
⇒ cost of capex will rise

(2) "<u>High</u> cost of rollout" as '<u>4G</u>' is not <u>too old</u> (cost of 4G not recovered)
⇒ reduced interest in spectrum allocat

(3) [frequency interference] — with aircrafts, and other <u>channels</u>

(4) digital divide in India (< 650 million use active internet connection, (TRAI, April 2024)

way out →
(1) Competition Promotion in telecommunication (<u>duopoly</u>)
   └ revival of BSNL

(2) <u>Subsidising</u> the customers

(3) development of indigenous equipment (<u>BSNL</u>) (PLI > 60% import substitution achieved) (ES-2023-2

[5G] is the mean of <u>digital</u> India, aatmnirbhar India and <u>developed</u> India

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Q.14) Discuss the repercussions on marine ecosystem and economy resulting from the combined effects of ocean acidification, ocean warming, and oxygen loss. (15 marks, 250 words)

महासागरीय अम्लीकरण, तापन तथा ऑक्सीजन हास के संयुक्त प्रभावों से समुद्री परितंत्र एवं अर्थव्यवस्था पर पड़ने वाले परिणामों की विवेचना कीजिए। (15 अंक, 250 शब्द)

[Marine ecosystem] involves marine Biodiversity, marine climate and marine ecology: It is highly sensitue to external changes.

√animals
(floral/fauna)
→atmosphe
Territory
(ABroh 2)
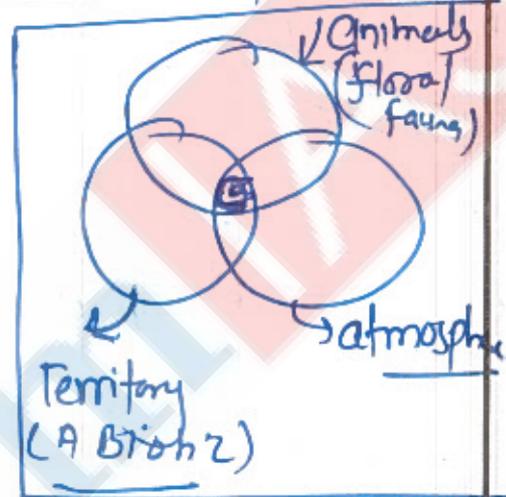
[Ocean acidification] means lowering of the pH of ocean ecosystem due to dissolution of CO_2. (from ↑B) to lower end (ocean fertilization)

[Impact] — ⓐ Stress on organisms
→ Corel Bleaching, loss in kelp forest, sea grass,

ⓑ [erosion of rocks] may lead to release of dissolued carbon and [methane hydrates] into atmosphere.

© Worsen the food web and web of marine ecology.

eg : (loss of appetite, offspring product)

[Ocean Warming] is the rise in average temperature of world oceans due to 'climate change' and greenhouse gas (GHG) effect from average of $27°c$ (IPCC 6th assessment).

Impact → ① [Coral Bleaching] expulsion of zooxanthalae (irreversible)

⟶ ② slowdown of global ocean conveyor 'Conveyor Belt'
  ⟶ affect ocean current
  · Salinity Balancing

③ more evaporation ⟹ more rainfall
  ⟹ more violent cyclones (Amphan, Okhi)

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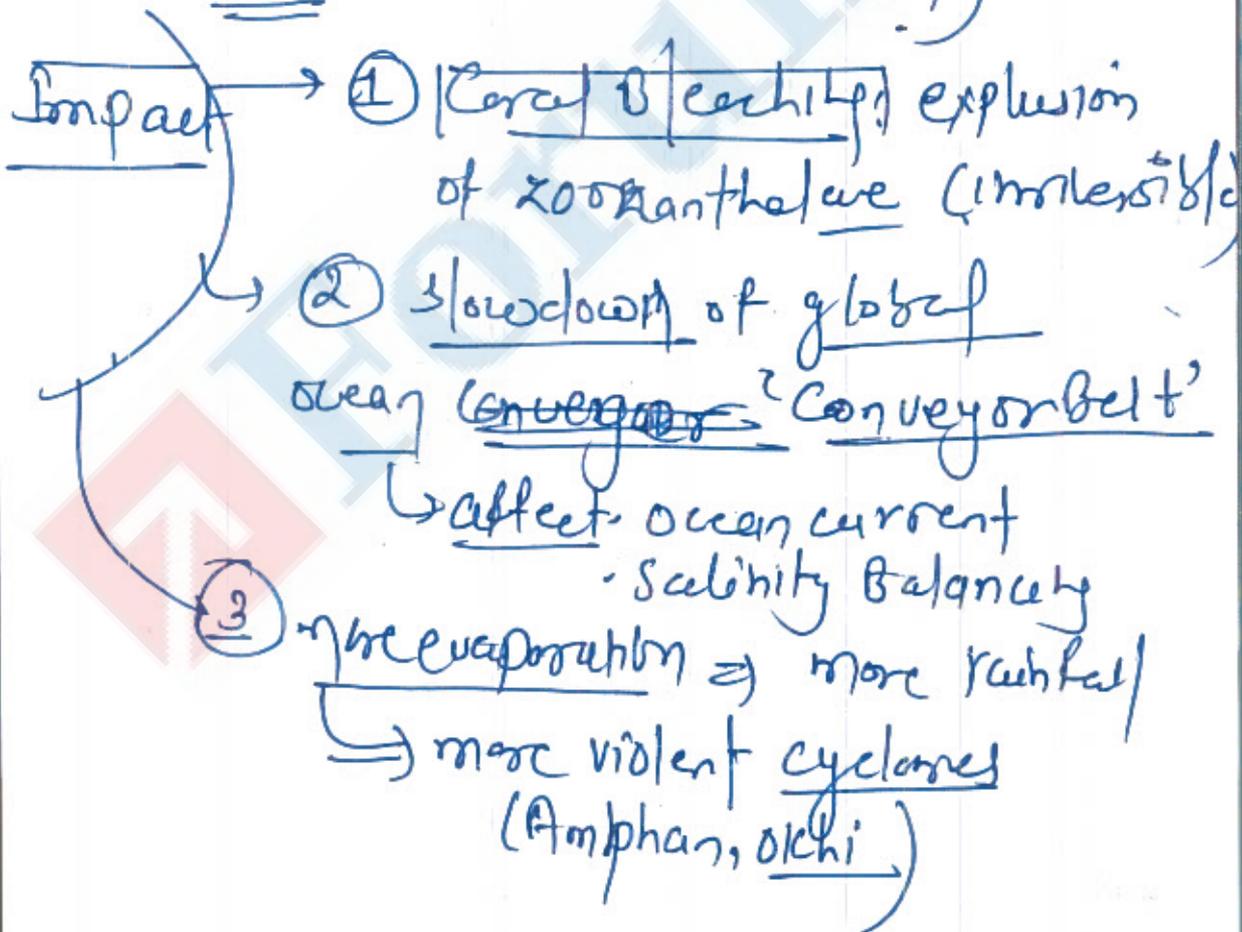
Oxygen loss is the reduction in dissolved oxygen in the marine water body-

Impact → ① killing of marine animals. (Gill Based)

→ ② affect Biodiversity of deep oceans (reliant on oxygen & not photosynthesis)

→ ③ reduce the productivity of ocean

ocean acidific—

Global Warming

Ocean healthy — Oxygen loss

As sea temperature is rising and level are moving up, there is a gross threat to our very existence on earth. &
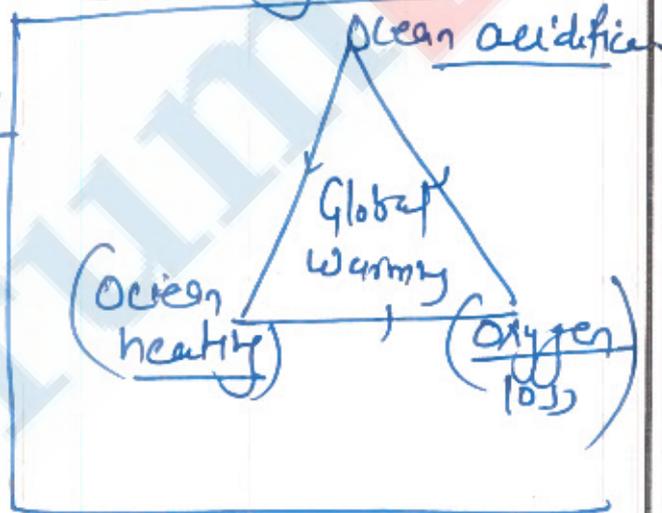
" Paris goal, SDG (17) and other international conventions " must be adhered to letter & spirit.

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

Q.15) The invisible nature of groundwater is a major obstacle in the path towards achieving the twin objectives of building climate resilience and meeting the Sustainable Development Goals (SDGs). Elucidate. (15 marks, 250 words)

भूमिगत जल की अदृश्यता जलवायु अनुकूलन एवं सतत् विकास लक्ष्यों (SDG) को पूरा करने के दोहरे उद्देश्यों को प्राप्त करने की दिशा में एक प्रमुख चुनौती है। विस्तारपूर्वक वर्णन कीजिए। (15 अंक, 250 शब्द)

'SDGs' are the 17 ambitious goal adopted by United nations by 2030.

SDGs
- SDG-10 inclusive growth
- SDG-14 Life below water
- SDG-15 Life on land
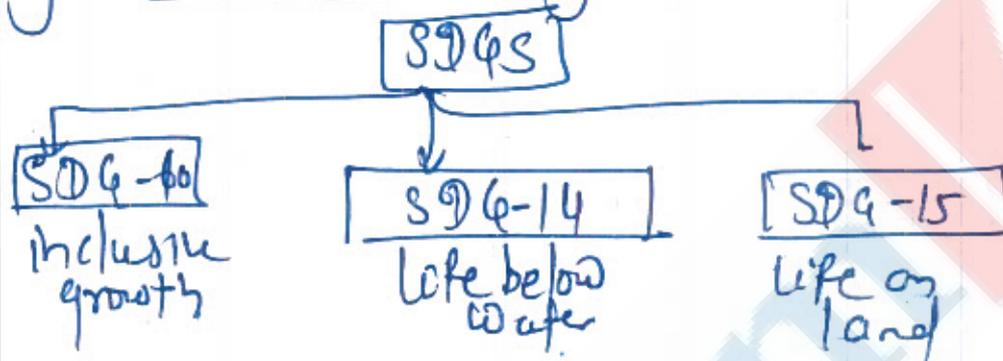
Climate change is happening for the worst (environmental performance index), therefore our resolve towards SDGs must be strong, but ground water, a major source of India's water needs is in dire state.

State of ground water —
↳ more than 60% of groundwater is lost between (2004-2019) (PCB report)
→ agriculture is highest consumer (80%)

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in this Area / इस स्था
पर कुछ न लिखें)

Climate Criteria and SDG

① Climate smart (Low water footprint) → but some water is needed.
agriculture
(what will happen in depleted regions)

② rising urbanisation (need water) , but cities observing zero day (Bengaluru)

③ Industrialisation (needs pure water) → Unavailability of (local Water Bodies)

④ equitable growth → threat to women if Groundwater is not available

② [NEED OF THE HOUR]

① | Ground water recharge | → atal
Bhujal yojana, rainwater harvesting
(surface pipe), impregnated Pavements

② develop artificial aequifers
└ (Traditional practice: Rajasthan's Tanka, Johad)

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③ development of water bodies

(Amrit Sarovar scheme, Budget
Behavioural   ~ 75000)   2023-24)
change
④ Rejuvenation of rivers (Namami
                                         Gange)

⑤ [Improve water use efficiency]

   ↳ • Per crop more drop (drip irrigation)
   ↳ • Circular economy (treatment
                          of Grey water)
                          storm water)
      * reduce
        Crop diversification based on
        Agri climatic conditions

["Water" is going to be the
bone of contention in future. Its
Saviour is humanity's saviour .]

⤓Forum IAS
(Don't Write anythin
in this Area / इस स्था
पर कुछ न लिखें)

Q.16) Describe the concept of loss and damage and evaluate its relevance in ensuring climate equity.
(15 marks, 250 words)

हानि और क्षति (Loss and Damage) की अवधारणा का वर्णन कीजिए तथा जलवायु समानता सुनिश्चित करने में इसकी प्रासंगिकता का मूल्यांकन कीजिए।
(15 अंक, 250 शब्द)

Loss and damage is based on the principle of Common but differentiated responsibility, but respected capability (CBDR-RC),

It mean, the country which are disproportionately bearing the brunt of industrialisation of developed economy and resulting climate change has right to compensation:

In COP-26 it was envisaged, which got created from COP-28 (Dubai)

Relevance → ① Technological transfer from developed world to third world ⇒

empower them to to 'mitigate' and 'adopt' against climate change.

② Based on principle of 'historical Burden' to compensate the LDCs

③ Role of global south in mitigation against climate change & saving of global Commons

④ Based on principle of Justice, equity & fairness.

However as EPI report. envisages that world needs $4-6 tn everyyear to actually meet the targets of paris, but [LDD fund] is grossly insufficient.

[Recent happenings] –

— Indonesia changed its

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Capital due to rise in sea level in 'Jakarta'
- 'Maldives' is also planning the same -
  (as many of its islands got flooded)

| Need of the hour |

→ ① Global handholdery is needed

→ ② Raise the funds and setup
     independent mechanism.

③ Principles of climate justice must
   be followed then only we will be
   able to achieve SDGs

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in this Area / इस स्था
पर कुछ न लिखें)

Q.17) What role does wetland play in expanding the framework of sustainable development? What are the challenges faced by wetland ecosystem? Discuss the corrective steps required for their effective conservation.
(15 marks, 250 words)

आर्द्रभूमि धारणीय विकास के ढांचे को विस्तारित करने में किस प्रकार योगदान देती है? आर्द्रभूमि परितंत्र किन चुनौतियों का सामना कर रहा है? इनके प्रभावी संरक्षण हेतु आवश्यक उपायों का वर्णन कीजिए। (15 अंक, 250 शब्द)

Wetlands are the permanent or semipermanent body of water like peets, Salt lakes, lagoons, Kayals. Globally they cover ~ 6.58% of area. (Ramsar Convention, 1972)

Role / Sustainable →

① "Kidney of the earth" act as filteration agents of toxic elements (like Cu, Zn) (organic & inorganic)

② [Carbon sink] → Peatlands covers only 3% of land, but store 00% of Carbon.

③ Protector of Biodiversity → eg Bengal Tiger, fishing Cat (Sunderban)

④ Act as a Buffer during climatic event (flood, cyclone, drought)

⑤ Provides livelihood - fishing, sports

(Kayaking) etc.

⑥ Maintaining food chain and overall life

Challenges faced

① Unreruptous development
⇒ encroachment
due to Continuously
rising population,
demand for growth
& industrialism
e: Pantanel, (Brazil+Bolivia)

Asan
Kolado
Santhar
(Nandur)
Kettaneye
Kodaikan
Sundarban
[Some wetlands]
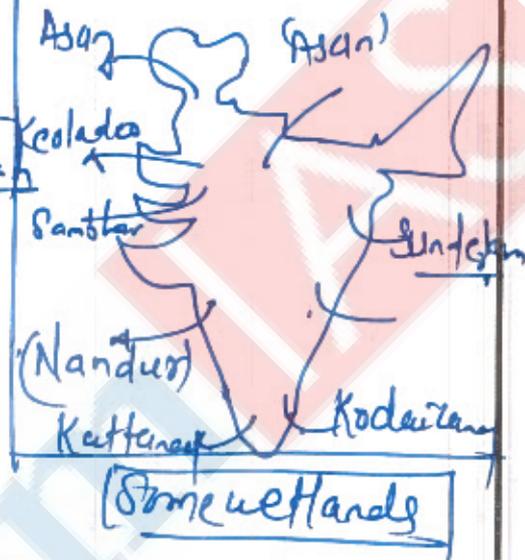
② [effluent discharge] of untreated
elements ⇒ loss of Carrying Capacity
(lonalake pink color)

③ [Use of water] indiscriminately without
adequate recharge ⇒ (Irregular
monsoon)

④ & [luxurious Urbanisation] ⇒ Urban
heatisland ⇒ more evaporation.

⑤ discharge of agricultural effluents.

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→ of Biological oxygen demand and COD.

[Corrective steps]: Needed.

① Provision of Buffer (tree plantation)
  └ (UN decade of ecosystem restoration)
                              2021-2031

② Check on unscrupulous development → (Wetland management rules, 2017)

③ Treatment of effluents (Grey water)
  └ via sewage treatment plants

④ Collaboration with civil society (WWI, WWF) and others → awareness of citizens

[Wetlands] are the lifeline of mother earth. philosophy of 'Prakruti rakshati Rakshita' (nature saves the one who saves it) shows their indispensable importance

Q.18) Despite various efforts, a lasting solution to the insurgency in the north-eastern region of India remains elusive. Analyse the reasons behind the continuation of insurgency in the region. Also, suggest effective measures to tackle it. (15 marks, 250 words)

विभिन्न प्रयासों के बावजूद, भारत के उत्तर-पूर्वी क्षेत्र में विद्रोह का स्थायी समाधान अभी तक नहीं मिल पाया है। इस क्षेत्र में विद्रोह जारी रहने के कारणों का विश्लेषण कीजिए। साथ ही, इसे निपटने के लिए प्रभावी उपायों को सुझाएँ। (15 अंक, 250 शब्द)

India's Northeast consists of 7 sister states / comprises of '8%' of territorial area.

- Northeast is reeling with insurgency since independence, which is always at recurring reeonx with the government.
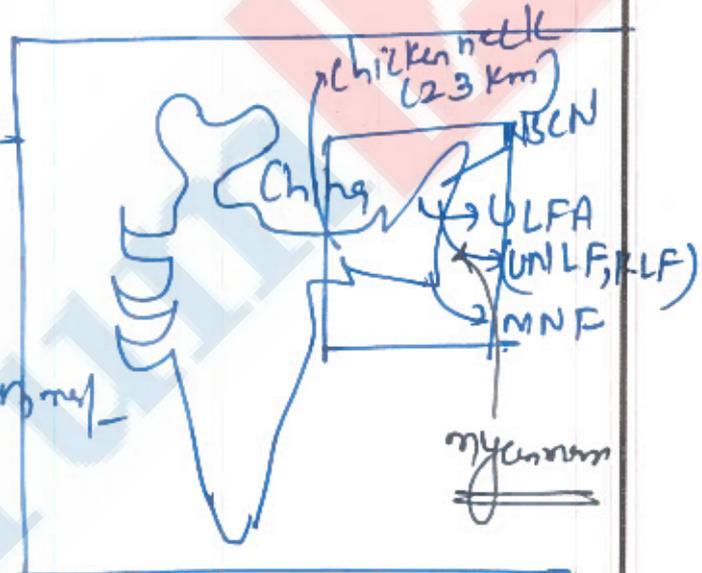
① Political dislike

Based on >400 ethnic groups and dialects with overarching territory eg: (Greater Nagalim - (Nagaland, Parts of Assam, Manipur, Myanmar)

② Social marginalisation vis-a-vis Indian mainland (high unemployment, low literacy, minimal economic opportunities)

③ role of hostile state & non state actors

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पर कुछ न लिखें)

China's support to insurgent groups.

④ Geographical isolation via only 23 km long chicken-neck corridor -

[Various effects] — ,

① (Peace talks) with various groups
  ↳ shillong accord (1985), failed to satisfy NSCN -Im

• Assam accord (2020) with AASU

• accords with UNLF of manipur is not accepted to KLF

② extensive focus on development of northeast →

  • Northeast council
  • ministry of development of north east region (10%, funding of central government's Budget)
  • Border area development
  • Aspirational district/Block program
  • vibrant village

③ diplomatic efforts → ↻

⤷ act east policy and connecting
NE to mainland (BBIN, Kaladan,
Kushiang river treaty)

→ Paradiplomacy

④ enactment of CAA, also to realize
their right to self determination,

[meaning required] —

④ extention of SAMADHAN policy of
LWE to N-E region

② ↑ focus on connectivity and people
to people exchange

③ development that respect their
autonomy should be prioritise

④ Continuous Peace Talks (Successful
Tripura, meghalaya)

"Dialogue, development and deterrence
is need of the hour to prevent
this Jewel of India from insurgency.

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Q.19) While developmental initiatives have a significant role to play, they alone cannot root out terrorism/ militancy in Jammu and Kashmir. Comment. (15 marks, 250 words

जम्मू-कश्मीर में आतंकवाद/उग्रवाद के उन्मूलन के लिए विकासात्मक पहलें महत्वपूर्ण हैं, परंतु ये अकेले पर्याप्त नहीं हैं। टिप्पणी कीजिए। (15 अंक, 250 शब्द)

Sihle ceuersion of J&K into India, it is marred with militancy, radicalisation and social lack of cohesion.

J&K reorganisation act, 2019 truly integrated J&K into Indian union and opened the path of development
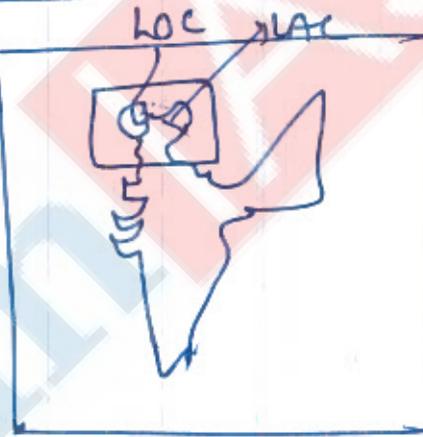
① [Development] → [Integration]

① [higher human capital] → responsible [citizenry] → entrepreneurships/ employment ↓ reduce militant tendencies

② higher equitable infrastructure ↳ equitable opportunities.

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eg: "Pathshala" rural → empowered
            areas"   Youth.

③ Promotion of likelihood + By connectivity
      with mainstream (market)

      Since 2019, Cases of Army-People
   Skirmishes has considerable came down
         (home ministry)

      However, the roots are still there →

① Ideological Bias — Consideration of
   US v/s them mentality ⇒ education

② lack of cohesion between people
      and security forces ⇒ erosion
                                   of trust

③ Presence of proxy powers (JsI,
      LeT) in Kashmir soil →
         Constant reinforcement &
         radicalisation of youth.

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पर कुछ न लिखें)

(4) failure and short coming of intelligence
→ Bolster the anti India forces.

| need of the hour |

(1) Rapport building between people of Kashmir and arms forces.
(operation sadbhavana)

(2) Restoration of all the basic facilities (internet, cinema, schools)

(3) Political engagement with all party involvement.

" Terrorism anywhere - is threat to prosperity anywhere".

~~The~~ Removal of Root cause (ideological base) is important to totally free J&K.

Q.20) What do you understand by theaterisation of commands? Enumerating the impediments in theaterisation for India's armed forces, discuss the role of Chief of Defence Staff in enhancing the effectiveness of India's external security response. (15 marks, 250 words)

कमांड के थियेटराइज़ेशन से आप क्या समझते हैं? भारत के सशस्त्र बलों के लिए थियेटराइज़ेशन में बाधाओं का वर्णन करते हुए, भारत की बाह्य सुरक्षा प्रतिक्रिया की प्रभावशीलता को बढ़ाने में चीफ ऑफ डिफेंस स्टाफ की भूमिका पर चर्चा कीजिए। (15 अंक, 250 शब्द)

Theatensation of command means the the perfect cohesion between different organs of armed forces under one umbrella with unity of chain of command

CDS

(Space force) + (Armed force   Air force   Navy)
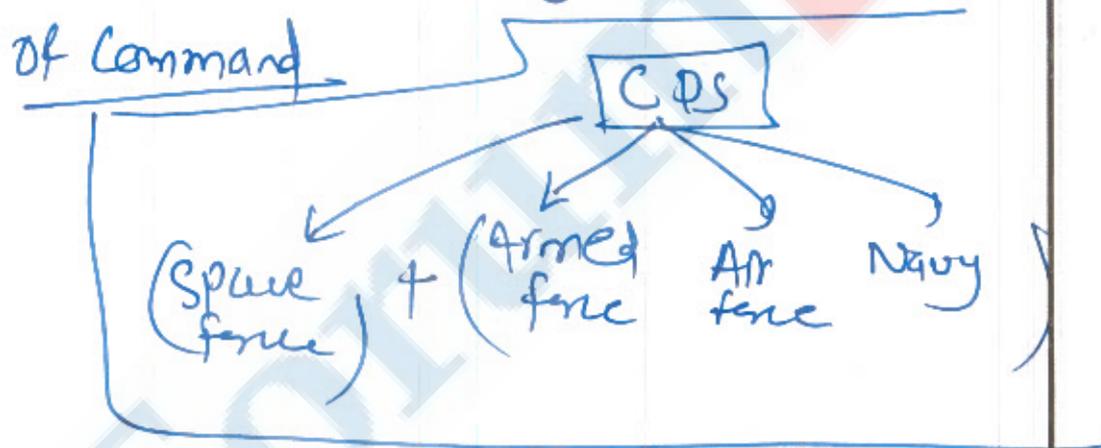
#Significance → ① Uniformity ② 'Agility and Tactics'

↪ ② Accountable force

↪ ③ 'Co-ordinated & synchronous' threat elearly

④ efficient utilisation of resources.

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in this Area / इस स्था
पर कुछ न लिखें)

[Impediments] —

① [equy issue], interface Bonhomie leads to resistant eg:- Sikh regiment y/s Bihar regiment, Army y/s Navy debate

② [loyality to the Cadre] → may bring indisciplne if in unified command

③ Rigid and different rank & hrerarchical structure? → 'difficult unification of posts & positions!

④ Complexity of process based on Postings, Positions and personnel.

Threat to Inder
— chiha's string of pearls
form - (air, water & land)

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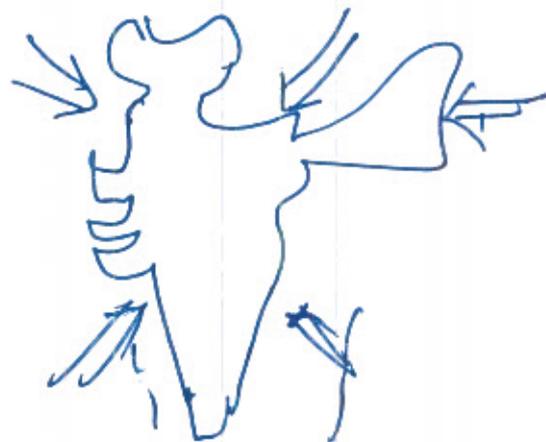
Calls for theerpensation

Role of CDS
→ 4 star general
→ advisor to defence Council (Chief)
→ Role as a Co-ordinater between different forces.

(Limitations)
→ ① no controlling authority
→ (rubber stamp)
↳ ② in actual; the Uniformity is not achieved across ranks.

Thus Given the complexity of Strategic & geopolitics, theaterisatin is need of the hour to emerge as most lethal force of the world. for SuperPower India,

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Mentor Feedback Questions

1 ....

2 ....

3 ....

4 ....

5 ....

Test Goal

1 .... □
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2 .... □
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3 .... □
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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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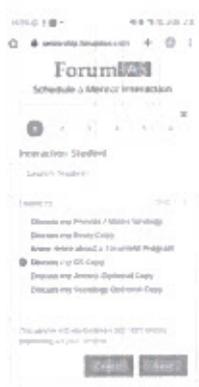
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