

TEST CODE : 5 1 3 2 4

FIAS - MGP 2022 (C-11) - Sectional Test #6

ForumIAS

GENERAL STUDIES

Name Of Candidate	SMRITI MISIIRA		
Roll No.	1910059516	Date:	30.08.22

Time Allowed: Three Hours

Maximum Marks: 250

INDEX TABLE			INSTRUCTION	
Q. No.	Max. Marks	Marks Obtained		
1			<p>1. Please do furnish Name, Email, Roll No and Mobile in the answer sheet.</p> <p>2. There are TWENTY questions printed in ENGLISH &amp; HINDI, all questions are compulsory.</p> <p>3. The number of marks carried by a question/part is indicated against it.</p> <p>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.</p> <p>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.</p> <p><i>Any specific messages for ForumIAS Mentors/ Evaluators with respect to your copy? Write it here.</i></p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p>	
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<b>Total:</b>	<b>250</b>			
<b>Evaluator's Discretion:</b>			<b>For Student Only</b>	
			Start Time   5 pm	End Time   8:20 pm
<b>Total Marks:</b>			Mode Of Examination:	Online <input checked="" type="checkbox"/> Offline <input type="checkbox"/>
<b>Evaluator's Discretion:</b> This is the marks awarded at the discretion of the evaluator based on your overall impression, on the basis of (but not limited to) your handwriting, presentation, use of diagrams, flowcharts, facts and figures or absolutely anything that he/she liked in your copy.			<b>For Office Use Only</b>	
			ECN CODE:	EG:
			Evaluation Date:	

**Note:** You can discuss your evaluated copy with the Mentor. Raise a ticket from your portal to schedule a mentor call or visit the offline centre to meet mentor (all 7 days, Timings - 11 AM to 6 PM). Further if you are unsatisfied with the evaluation, you can seek re-evaluation of the copy.

Parameters	Excellent	Very Good	Good	Average	Poor	Very Poor
Language						
Structure						
Presentation						
Handwriting						
Content						
Attempt						

**ADDITIONAL REMARKS**



Q.1) The consequences flowing from genetically modified organisms are debatable, but the advantages justify the risk. Do you agree? Discuss. (10 marks, 150 words)

आनुवंशिक रूप से संशोधित जीवों (GMO) से निकलने वाले परिणाम बहस योग्य हैं, लेकिन इसके फायदे जोखिमों का औचित्य सिद्ध करते हैं। क्या आप सहमत हैं? चर्चा कीजिए। (10 अंक, 150 शब्द)

Genetically modified organisms (GMOs) are those organisms that carry a foreign gene introduced in them through recombinant DNA technology.

For eg: Bt cotton carries CRY gene from a bacterium thuringiensis that enables it to resist pest attacks. (Bt cotton is a GMO)

Consequences flowing from GMOs are debatable

→ Threat to local biodiversity and endemic flora & fauna

→ Health consequences not well characterised  
 Eg: Bt Brinjal → not sold due to these concerns.

→ Produces sterile animals/plants: loss of variation  
 ↳ Bt cotton has a gene that suppresses seed formation  
 ↳ loss of vigour

→ Concerns that bioweapons can be manufactured  
 eg: theories that suggest COVID-19 was lab manufactured.

None of these theories, however, are scientifically established.

Advantages are far more to justify the risk

→ Pest resistant, herbicide tolerant crops

→ Manufacture of life-supporting hormones

↳ Insulin  
↳ Human Growth Hormone

→ Prevention of tumors in plants

↳ eg: Agrobacterium tumefaciens in tobacco  
plants protect against TMV virus

→ Increase variation through cross fertilisation in self-pollinating plant

↳ eg: DMH-11 Mustard produced by Delhi University

→ Engineering viruses as vectors for gene therapy

GMOs (microbes, plants, animals) revolutionise the way we live by offering simple solutions to debilitating problems. The government must focus on increasing awareness and acceptability of GMO products.

**Feedback**

(For OFFICE use)

Structure/  
PresentationQuestion  
Interpretation

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Q.2) How are fuel cell electric vehicle (FCEV) different from battery electric vehicle (BEV)? Highlighting advantages of electric vehicles, suggest measures for accelerating e-mobility adoption in the country. (10 marks, 150 words)

ईंधन सेल इलेक्ट्रिक वाहन (FCEV) बैटरी इलेक्ट्रिक वाहन (BEV) से कैसे भिन्न हैं? इलेक्ट्रिक वाहनों के लाभों पर प्रकाश डालते हुए, देश में ई-मोबिलिटी अपनाने में तेजी लाने के उपाय सुझाएं। (10 अंक, 150 शब्द)

With increasing demand of automobiles, and target for carbon neutrality and emission reduction (by 45%), electric vehicles are promoted as the vehicles of the future.

### Fuel Cell EV

- Uses a fuel cell to generate energy
  - ↳ based on catalytic electrolysis of water as a fuel
- conversion of fuel to energy through combustion
- More number of moving parts
- Refuel time 3-4 minutes

### Battery Electric Vehicle

- Uses electrochemical batteries
  - ↳ lithium ion
  - ↳ Solid state battery
- An electrochemical gradient is established for current to flow
  - ↓
  - this is harnessed to rotate propel vehicle
- Lesser no. of moving parts
- Recharge requires 4-12 hours

### Advantages of electric vehicles

- Non polluting and clean operation
- Low cost
  - ↳ no fossil fuel used
  - ↳ exhausts do not have CO, NO or particulate matter
- Reduce import dependency
  - ↳ improve current account deficit
- Higher efficiency than conventional vehicles
- Create employment opportunities

### Measures for accelerating e-mobility

- Tax breaks and tax incentives to bring down effective cost
- set up enabling infrastructure. eg refuelling / recharging stations
- Discourage Encourage scrapping of old polluting vehicles eg: Vehicle scrapping policy
- Behavioural change in consumers &

The govt's push towards "Lifestyle for Environment" (LIFE) Mission is an important step towards decarbonising ~~to~~ and reducing emissions through sustainable behavioural change.

Feedback (For OFFICER)
Structure/ Presentation
Question Interpretation
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Value Addition
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Q.3) Space based technologies are helpful in not only monitoring development, but also enhancing it. Discuss. (10 marks, 150 words)

अतिसि आधारित प्रौद्योगिकियां न केवल विकास की निगरानी करने में सहायक हैं, बल्कि इसे बढ़ाने में भी सहायक हैं। चर्चा कीजिए। (10 अंक, 150 शब्द)

Space based technologies are primarily satellite based systems that enable imaging and communication by placing satellites at different orbits — Low Earth / Geostationary / Geosynchronous — for different purposes.

### Helpful in monitoring development

- Help estimating forest cover (eg: State of Forest Report)
- Preparing land atlas of India
- Quantifying extent of desertification (30% - ISRO)
- Measure sprawl of urban cities
- Shrinking of wetlands (eg: Chennai map)
  - ↳ before and after urban floods
- Help in monitoring progress of infrastructure projects, especially in border areas, GIS based master plan for AMRUT cities

### Helpful in enhancing development

- Communication satellites — INSAT
  - ↳ Telemedicine and radio networking in rural areas
- Navigation : IRNSS — NAVIC
  - ↳ vehicle tracking, fleet management
  - ↳ mapping

**GAGAN** - enables pilot to navigate

- Agriculture - Cartosat satellite
  - crop area, crop yield estimation
  - can detect soil health / degradation
  - FASAL → agri output

- Disaster management - early warning and response in cyclones, floods, heat waves
  - ↳ coronavirus tracker was GIS based

→ Research: Chandrayaan-2 : surface composition of moon

- Industry :- GIS based services
  - ↳ ISRO also offers services to private players, earns revenue ₹

India holds a 34% share in global space economy. Enhancing this would lead to development, job creation and overall benefit to economy.

**Feedback**

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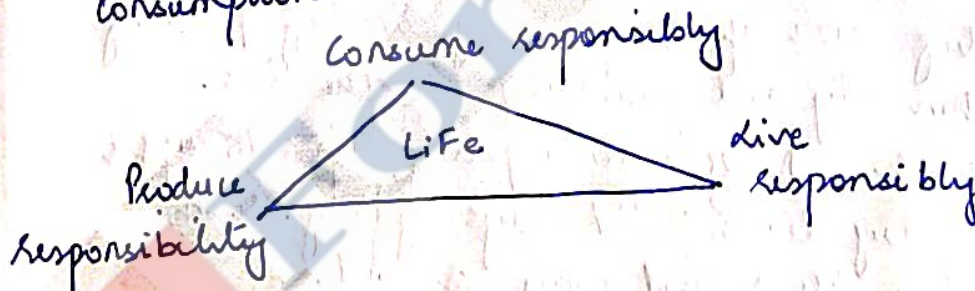
Q.4) Ensuring sustainable consumption and production patterns for an environmentally conscious world is not possible without fundamental changes in lifestyle. Discuss this statement in light of Lifestyle for the Environment (LiFE) Movement. (10 marks, 150 words)

जीवन शैली में मूलभूत परिवर्तन लाए बिना पर्यावरण के प्रति जागरूक दुनिया के लिए सतत उपभोग और उत्पादन पैटर्न सुनिश्चित करना संभव नहीं है। पर्यावरण के लिए जीवन शैली (LiFE) आंदोलन के आलोक में इस कथन की चर्चा कीजिए। (10 अंक, 150 शब्द)

Lifestyle for the Environment (LiFE) Movement was proposed during COP-26 and launched on June 5, 2022 - on the occasion of World Environment Day.

### Principles of LiFE

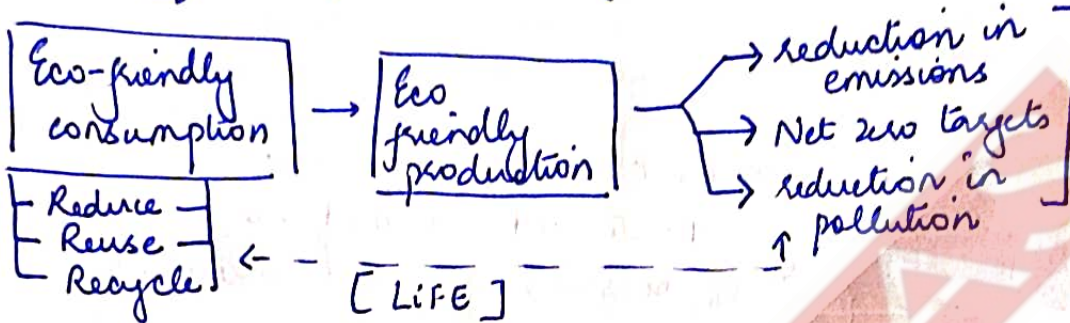
- Behavioural change with respect to lifestyle to promote sustainability
- Mindful and deliberate utilisation or consumption



### Need for LiFE

- According to UNEP, if 1 billion out of 8 billion people adopt eco friendly behaviour, the global carbon emission could drop by 20%.
- India could lose upto 6 trillion USD if no climate action is taken.

- More than 50% population will be negatively affected by climate change in India.



Suggestions for LIFE by TERI

- Improve energy efficiency of LED usage
- Bio-circular economy promotion
- Increase use of renewables

Countries like Denmark are showing the way by promoting use of bicycles by limiting parking ~~not~~ within city and promoting bike lanes. Chandigarh's Draft cycling policy aims to offer a half day leave for 7 days cycling. Such initiatives are a good way forward.

Feedback	
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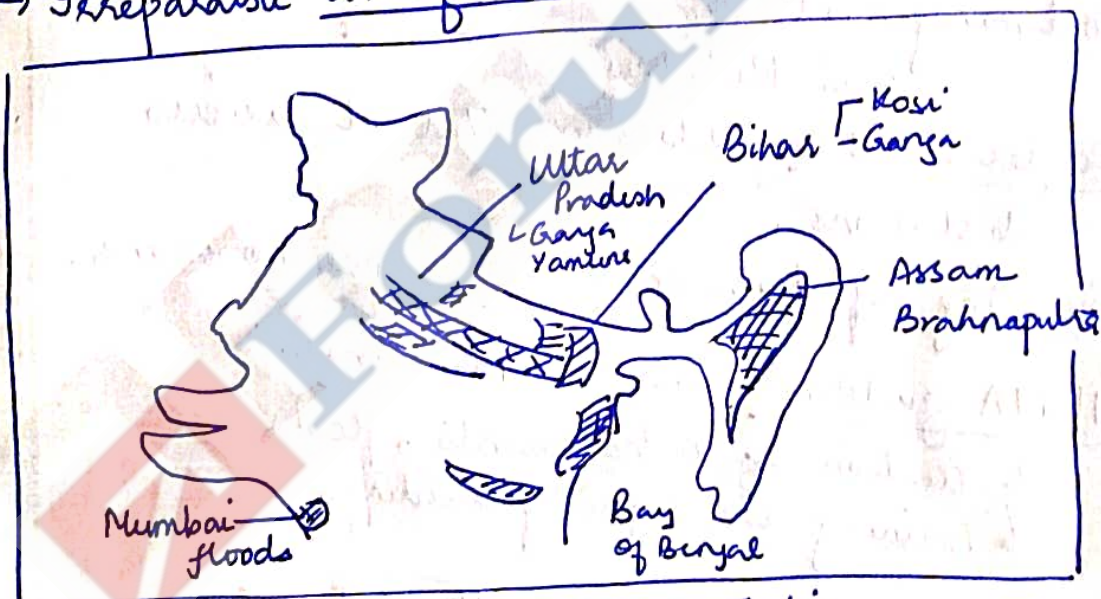
Q.5) Managing risks, rather than impacts, lies at the core of effective disaster management strategy. In light of this statement, describe the flood risk profile of India and evaluate preparedness for effective flood management. (10 marks, 150 words)

प्रभावों के बजाय जोखिमों का प्रबंधन, प्रभावी आपदा प्रबंधन रणनीति के मूल में निहित है। इस कथन के आलोक में, भारत के बाढ़ जोखिम प्रोफाइल का वर्णन करें और प्रभावी बाढ़ प्रबंधन के लिए तैयारियों का मूल्यांकन करें।

(10 अंक, 150 शब्द)

12% of India's land area is vulnerable to flooding. Since flooding is ~~an~~ a calendar event, there is a need to manage risks rather than impacts :

- large, densely populated areas in India
- epidemic and diseases post disaster
  - ↳ increasing disaster impact
- Irreparable loss of lives and livelihoods



Map Flood risk profile in India

- North Indian plains
  - ↳ Flooding of Ganga and Yamuna rivers due to monsoon rains

- Bihar
  - ↳ Flooding due to Kosi river frequently changing course
- Assam and North East
  - ↳ due to fast flowing Brahmaputra
  - ↳ shallow waters
- Cities are increasingly experiencing urban floods due to illegal encroachments and unplanned urbanisation  
eg: Chennai floods, Hyderabad, Kerala floods

### Preparedness for effective flood management

- Flood management system — IFLOWS installed in Mumbai
- Doppler weather radars installed at various sub stations.
- Desilting of drainage systems before monsoons.
- NDMA guidelines on Flood plain Zonation
  - ↳ creation of embankments, flood walls
  - ↳ Training and capacity building.

↳ Niti Aayog also came up with National Water Model. Buoyant Buildings scheme of Netherlands is a good model to emulate.

Feedback  
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Q.6) Solar power sector is not only leading the mitigation efforts against climate change, but the innovations in solar power can also accelerate adaptation of agriculture to a new reality of changed climate. Discuss. (10 marks, 150 words)

सौर ऊर्जा क्षेत्र न केवल जलवायु परिवर्तन के खिलाफ शमन प्रयासों का नेतृत्व कर रहा है, बल्कि सौर ऊर्जा में नवाचार भी बदली हुई जलवायु की एक नई वास्तविकता के लिए कृषि के अनुकूलन में तेजी ला सकते हैं। चर्चा करें।

(10 अंक, 150 शब्द)

The National Solar Mission aims to create 100 GW of solar energy — 60<sup>GW</sup> from grid connected solar parks and 40 GW from rooftop panels.

Solar power is leading mitigation effects against climate change

According to IPCC report, ~~the~~ India has experienced a 0.6°C rise in temperature due to climate change and can potentially cause a loss of \$6 trillion by 2050.

→ Coal based power generation

↳ is polluting — Greenhouse gas emissions

↳ Particulate matter emissions

↳ unsustainable — fossil fuel based

→ Conversely, solar power is not for renewable, clean and non-emitting



(Don't Write anything in this)

## Innovations in solar power can accelerate adaptation of agriculture :

- Solar pumps - cost effective, non-polluting  
↳ address rising fuel costs
- Agricultural machinery (tractors etc) - based on etc solar photo voltaics
- Direct use of solar technology → in creating greenhouses for horticulture
- Solar lights, etc

India aims to achieve net zero target by 2070, and transform its energy mix to have 500 GW of energy from renewables. Agg Adaptation in Agriculture is a promising step towards the same.

Feedback	
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Q.7) Necessitated by contingent law & order situation in the North-Eastern states in 1958, Armed Forces (Special Powers) Act (AFSPA) continues to be applicable even after six decades of its enactment despite widespread criticism. Critically evaluate the utility of AFSPA in light of prevailing security environment in the country. (10 marks, 150 words)

1958 में उत्तर-पूर्वी राज्यों में आकस्मिक कानून और व्यवस्था की स्थिति के कारण, सशस्त्र बल (विशेष अधिकार) अधिनियम (AFSPA) व्यापक आलोचना के बावजूद इसके लागू होने के छह दशकों के बाद भी लागू है। देश में प्रचलित सुरक्षा वातावरण के आलोक में AFSPA की उपयोगिता का समालोचनात्मक मूल्यांकन कीजिए। (10 अंक, 150 शब्द)

Armed Force (Special Powers) Act (AFSPA) is a series of laws enacted to deal with insurgency and law and order situation in the North-East Region.

### Key provisions of AFSPA

- Power to enter and search  
↳ no warrant required
- Power to detain any individual
- Maintenance of public order in a "disturbed area".

### UTILITY OF AFSPA

(A) AFSPA should be retained -

→ North East shares a long international border with 4 countries

↳ movement of insurgents, cross border crime

→ North Eastern states still grappling with insurgency and terror groups

↳ eg: NSCN-IM, NSCN-IM demand for Greater Nagaland

- Army needs special powers to take urgent decisions and tackle specialised form of violence
  - ↳ legal complexities work and compliances will deter prompt action

### (B) AFSPA should be removed

- allegations of human rights abuse by the army.
- No action or remedy available to the aggrieved — AFSPA provides <sup>legal</sup> safety agor
  - ↳ need consent of govt to initiate proceedings
- Several committees in the past have recommended its repeal based on different grounds
  - eg: Justice Verma committee
    - ↳ AFSPA ~~used to~~ provides immunity against sexual harassment
    - eg - Manjiv case - women holding placards saying "Indian Army Rape us" and against Kishan Peshora incident.
  - Santosh Hegde committee suggested that AFSPA must be made "more humane". Strict action need to be taken against alleged perpetrators to develop confidence and trust among people.

Feedback

(For OFFICERS)

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Interpretation

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Q.8) Why has fake news on the internet emerged as an internal security challenge? How can we identify a fake news? Also, throw light on legal and institutional arrangements to tackle fake news.

(10 marks, 150-words)

इंटरनेट पर फेक न्यूज आंतरिक सुरक्षा चुनौती के रूप में क्यों उभरी है? हम एक फेक न्यूज की पहचान कैसे कर सकते हैं? साथ ही, फेक न्यूज से निपटने के लिए कानूनी और संस्थागत व्यवस्थाओं पर प्रकाश डालें। (10 अंक, 150 शब्द)

Fake news refers to a set of false information maliciously designed and propagated over social media often with an ulterior motive.

It is an internal security challenge as

- Spreads like wildfire, difficult to control
- Difficult to trace the origin (anonymity)
  - ↳ encryption technology used by messaging platforms like whatsapp
- Creates law and order challenges
  - ↳ eg: Udaipur Killing, Palghar riots
- Polarisation in the society
  - ↳ communal clashes and riots
- Difficult to disprove its veracity.

Identifying fake news

- the use of fact-checking sites - list promoted by government
  - ↳ eg- Alt-News
- Googling keywords from the news-item
- Check credibility of news site, author, sources.

- Using softwares to identify file manipulation  
↳ in case of images / videos
- Verifying with trusted sources

### Legal and institutional arrangements

- ↳ While there are no explicit acts to ~~create~~ <sup>define</sup> ~~prevent~~ fake news, the consequences are punished as an offence under -
- Information Technology Act, 2000 - Section 69(1)
- IPC section 295A, 509, 153A  
↳ Promoting enmity

### Institutional arrangements -

- Grievance Redressal Officers (GRO) under Intermediary Rules (IT Act) on social media intermediaries
- Dedicated information commissioners in ministries

In Tehseen Poonawalla v. Union of India, Supreme Court issued preventive guidelines against Fake News. Rajew Gauba Panel has also suggested steps to ensure accountability of social media platforms, which need to be implemented on urgent basis.

#### Feedback

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Interpretation

Content

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Q.9) Discuss the salient features of Agnipath scheme. Underlining the benefits of the scheme, mention ways to overcome associated challenges. (10 marks, 150 words)

अग्निपथ योजना की मुख्य विशेषताओं की चर्चा कीजिए। योजना के लाभों को रेखांकित करते हुए, संबंधित चुनौतियों को दूर करने के तरीकों का उल्लेख करें। (10 अंक, 150 शब्द)

Agnipath is a pan India recruitment scheme for soldiers called "agniveers" across three services.

### Features of Agnipath scheme

- Pan India recruitment
- 46,000 Agniveers, age 17.5 to 21.5 years to be recruited
- 4 ~~to~~ year service with 6 months basic training
- After 4 years
  - ↳ 25% will be inducted into regular service for 15 years
  - ↳ 75% will be demobilised
- 75% demobilised soldiers will get
  - ↳ ₹ 11 lakh Seva Nidhi, skill certification
  - ↳ no pension or gratuity.

### Benefits of scheme

1. Younger, leaves armed forces
2. Reduce defence pension budget (₹ 1.19 lakh crore at present)
3. Increased spending on CAPE capital expenditure

(Don't Write anything in this)

- 4. Tech savvy youth inducted
  - ↳ contactless, cubicle warfare
- 5. Defence modernisation

Challenges and measures to overcome

1. Risk averse soldiers looking for second careers

- Regular induction will depend on performance and risk taking ability

2. Trained soldiers demotivated as civilians

- Psycho-social therapy before integration  
↳ community based

3. Against military ethos of Naam-Namak-Nishan  
↳ demoralise soldiers

- offer lucrative reservation in civilian government jobs including civil police

4. Psychological impact on young agniveers

- Counselling, skill development and job availability to reduce stress

Modern armies of USA, & Israel already follow this model of induction. India's defence expenditure is \$76 billion (SIPRI), and salaries and pensions constitute a revenue expenses — agnipath is a method of rationalisation.

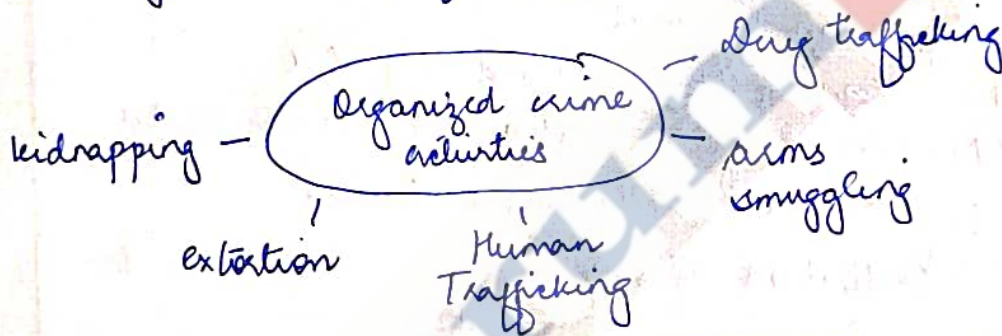
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Q.10) Examine how advancements in technology has allowed organize crime syndicates to not only expand but also diversify their activities. Also recommend suitable measures to tackle the menace of organized crime. (10 marks, 150 words)

परीक्षण करें कि कैसे प्रौद्योगिकी में प्रगति ने संगठित अपराध सिंडिकेट को न केवल विस्तार करने बल्कि उनकी गतिविधियों में विविधता लाने की भी अनुमति दी है। संगठित अपराध के खतरे से निपटने के लिए उपयुक्त उपायों की भी सिफारिश करें। (10 अंक, 150 शब्द)

Organised crimes <sup>syndicates</sup> are complex, continuing hierarchy-based groups that indulge in violence, corruption, money laundering and other illegal activities primarily to make profits. eg: D-company



Advancements in technology has allowed syndicates to divers expand and diversify —

→ Blockchain technology

↳ Decentralised finance & cryptocurrency

↳ increased money laundering, terrorist financing activities without coming under govt's radar

eg: Hezbollah accepting payments in crypto

→ 3-D printing → small arms manufacturing, pistol design assembly —

- functional pilots  
 ↳ support to over-ground workers
- Dark web and the internet  
 ↳ chat rooms, groups, platforms  
 ↳ recruitment for terrorist activities  
 ↳ pornography, morphed pictures  
 ↳ planned terror attacks on critical infrastructure  
 eg: ShadowPad

### Measures to tackle organised crime

Steps already taken by govt

- ↳ Prevention of Money Laundering Act
- ↳ Narcotic Drugs & Psychotropic Substances Act
- ↳ Enforcement Directorate, National Investigation Agency

Steps needed -

- Electronic surveillance strengthening:
  - ↳ dedicated task force to monitor cyber space
  - ↳ Data analysis and pattern prediction using algorithms
  - ↳ evidence collection and prosecution
- Undercover operations (eg: illegal drugs, firearm purchase)
- Setting up informants

Organised crime syndicates are often directly linked with terror groups. A comprehensive approach is necessary to reach the higher echelons and catch them.

**Feedb**

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Q.11) Nanotechnology is an inter-disciplinary and inter-connected science that has revolutionary applications across sectors. In this perspective, discuss the relevance of nanotechnology for socio-economic development in the country. (15 marks, 250 words)

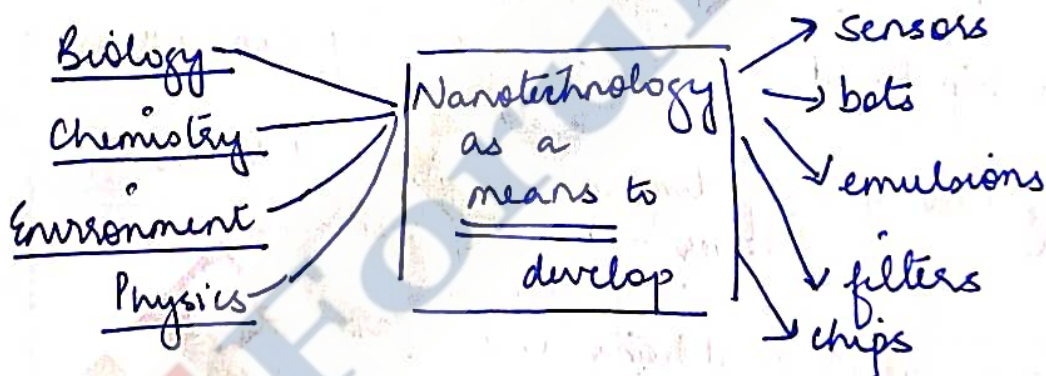
नैनोटेक्नोलॉजी एक अंतर-अनुशासनात्मक और परस्पर जुड़ा हुआ विज्ञान है जिसके सभी क्षेत्रों में क्रांतिकारी अनुप्रयोग हैं। इस परिप्रेक्ष्य में, देश में सामाजिक-आर्थिक विकास के लिए नैनो प्रौद्योगिकी की प्रासंगिकता पर चर्चा करें।

(15 अंक, 250 शब्द)

Nanotechnology refers to use of materials at scale of one-billionth of a meter ( $10^{-9}m$ ) for industrial applications.

It involves working at an atomic or subatomic levels.

Nanotechnology is an interdisciplinary science



~~Nano~~ The fundamental properties of any particle changes when it reaches a nano scale.

For eg: Gold metal is inert while gold nanoparticles are widely employed catalysts.

Relevance of nanotechnology

Nanotechnology finds applications in numerous fields

## Agriculture

- Nanofertiliser - directly sprayed on leaves  
 g: IIFCO's nano urea  
 - 60% lesser usage [ economical & efficient ]
- Nanopesticides ; nanobarcodes to detect invasive species
- Nano sensors - precision farming, soil health monitoring

## Health

- Nanobots - clearing up plaque inside blood vessels
- Nano sponges - clearing up toxins, membrane bound particles
- Nanochip based sensors - detection of cancerous cells
- Drug delivery - effective in crossing blood-brain barrier → treat Parkinson's, Alzheimer's

Improves social conditions and social capital of country by enabling longevity and health.

## Environment

- Nanofilters - clearing up waste water  
 L healthy environment → natural capital
- Nano biosensors in soil can detect contamination and prevent health hazards.



Electronics

- Carbon nanotubes have the potential of replacing semiconductors in the next few decades
- nanowires are more conductive and stronger

Space & Defence

- Defence - easier targeting by acting as precision guiding tools
- Carbon nanotubes can reduce weight of spacecraft → economical & efficient.

The government has been putting thrust on development of nanotechnology since two decades, and the <sup>effects</sup> ~~results~~ are bearing fruits, primarily in agriculture. The need is to ~~reinforce~~ reinvigorate the Nano Mission and increase funding for research & development in nanotech.

**Feedback**  
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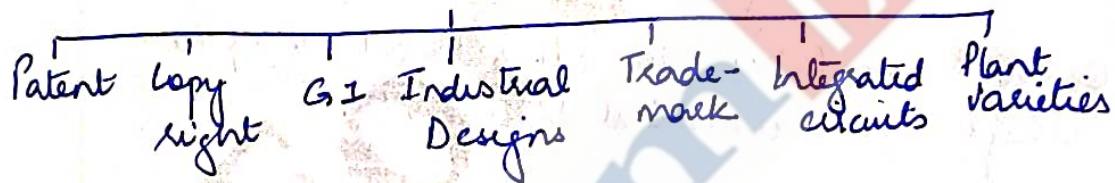
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Question Interpretation
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Total

Q.12) The increasing demand for stronger Intellectual Property Rights (IPR) protections is motivated by a desire to invigorate a groundswell of innovation, but it is more likely to lead towards IP monopolies. Examine. (15 marks, 250 words)

मजबूत बौद्धिक संपदा अधिकार (IPR) सुरक्षा की बढ़ती मांग नवाचार के आधार को मजबूत करने की इच्छा से प्रेरित है, लेकिन इससे बौद्धिक संपदा (IPR) के एकाधिकार की ओर ले जाने की अधिक संभावना है। परीक्षण करें। (15 अंक, 250 शब्द)

Intellectual Property Rights (IPR) are rights to exploit a person's creative intelligence and products created by human mind.

### IPR regime



Demand for stronger IPR is motivated by a desire to invigorate a groundswell of innovation

- offers incentives for innovation and rewards for novelty  
eg: copyright over literary, musical and artistic works — protection for 60 years after death of author
- ~~Encourages~~ Encourages competition

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- Help realise costs involved in longer research and development  
for eg: vaccine patents, technologies like pest resistance in crops (Bt cotton)
- Development of knowledge ecosystems



→ Nation building - technological progress leads to economic development and further nation building. eg: USA, Japan.

Stronger IPR leads to IP monopolies

⇒ (A) For -

→ Big Pharma companies exploit legal loopholes to engage in evergreening of patents. eg: Novartis case

→ Using IP laws to oppress / kill domestic industry or local manufacturing  
eg: Monsanto suing Indian farmer's company Nuziveedu for using pest-resistance technology for cotton plants.

→ Works against the interest of the weaker and vulnerable

eg: Leprico suing farmers in West India for growing a certain potato

⇒ (B) Against -

→ TRIPS Agreement and IPR laws of countries have sufficient safeguards against monopolies  
eg: Compulsory licensing in case of

- public good
- Parallel imports for public welfare (patents)
  - Fair use under copyrights Act (s.52)

Intellectual Property Rights (IPR) protect misuse of intellectual property and enable realisation of efforts behind its creation. India's generic drug manufacturing has been often criticised by developed countries, however, India's role as major vaccine supplier has proved there needs to be a balance between public good and IPR protection.

**Feedback**

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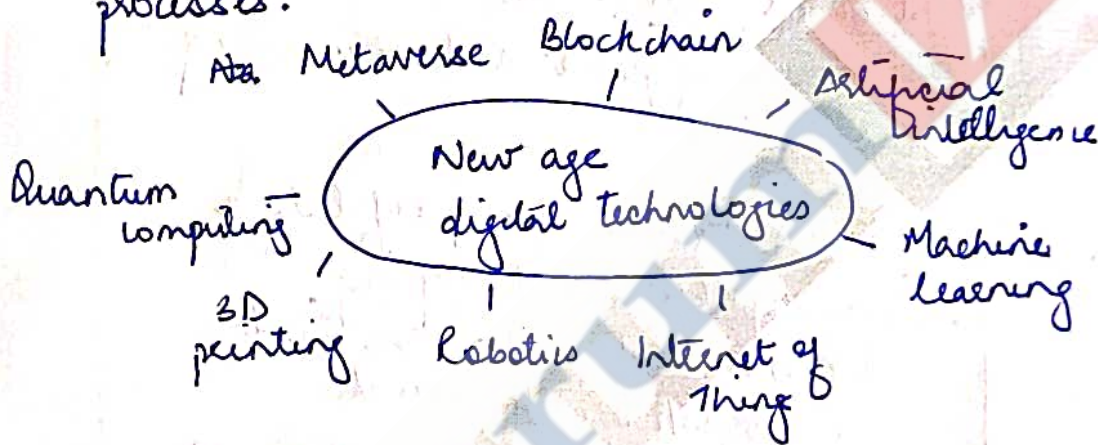
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Value Addition
Total



Q.13) New age digital technologies are creating disruptions that open fascinating opportunities and pose frightening threats. Give an account of how digital disruptive technologies are changing our lives. (15 marks, 250 words)

नए जमाने की डिजिटल प्रौद्योगिकियां व्यवधान पैदा कर रही हैं जो आकर्षक अवसरों को खोलती हैं और भयावह खतरे पैदा करती हैं। डिजिटल डिसरप्टिव प्रौद्योगिकियां हमारे जीवन को कैसे बदल रही हैं, उनका लेखा-जोखा दीजिए।

Digital "disruptive" technologies are those technologies that bring about "creative destruction" leading to a complete overhaul of systems and processes. (15 अंक, 250 शब्द)



Fascinating opportunities created by digital technologies -

- Artificial intelligence & machine learning - backbone of 4th Industrial revolution
  - ↳ perform ~~top~~ tasks with a huge dataset backing their actions
  - ↳ have revolutionised ~~our~~ everyday life
    - eg: Predictive search (Google),
    - Recommended videos (Youtube),
    - song, shopping apps

- Internet of things - backed by 5G technology  
 ↳ enable "things" to communicate with each other  
 eg: Driverless cars in future
- 3-D printing → used to not only create everyday objects but ~~also~~ artificial organs, plant based meat, etc  
 ↳ saving planet and ~~also~~ saving lives
- Blockchain: Decentralised fool-proof ledgers  
 ↳ incorruptible record keeping  
 ↳ can be used to ~~also~~ store land records/ health records
- ↳ Smart contracts - legal & professional fields
- ↳ Decentralised finance - ease of access,  
 ↳ convenience to user  
 ↳ no depreciation ~~is~~ due to inflation (savings protected)
- Robotics - mechanisation and ~~also~~ performing boring, repetitive tasks  
 ↳ speeding up production through automation.



However, they also pose frightening threats

- AI takeover — experts predict AI will turn sentient and will takeover the world
- 3D printing of weapons — instability in society, fear
- Cryptocurrency & NFT — medium of money laundering and terrorist financing  
(eg: US Treasury Report)
- Driverless cars — inability to take critical decisions — programming morality is difficult
- Metaverse — unregulated online sphere
  - ↳ facilitates monetary transaction
  - ↳ cyber crimes over metaverse
  - ↳ jurisdictional challenges
 eg: woman recently alleged that her avatar was raped on Metaverse.

India also lacks a comprehensive data protection law. The Big Tech is an all-pervasive entity today controlling most of digital technology. Regulating the same is a challenge that needs to be addressed urgently.

**Feedback**

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Structure/ Presentation
Question Interpretation
Content
Value Addition
Total

Q.14) Single use plastic (SUP) is a health, economic and environmental scourge, that requires governments to regulate, businesses to innovate and individuals to act. Examine in context of recently introduced ban on SUPs. (15 marks, 250 words)

सिंगल यूज प्लास्टिक (SUP) स्वास्थ्य, आर्थिक और पर्यावरणीय संकट है, जिसके लिए सरकारों को विनियमित करने, व्यवसायों को नवाचार करने और व्यक्तिगत रूप से कार्य करने की आवश्यकता होती है। सिंगल यूज प्लास्टिक पर हाल ही में शुरू किए गए प्रतिबंध के संदर्भ में परीक्षण करें। (15 अंक, 250 शब्द)

- Single use plastics <sup>(SUP)</sup> refer to a wide variety of plastic products that are discarded after one-time use.  
For example - straws, ear buds, packaging material

→ 46% of packaging material is plastic, out of which 95% is single use-plastic.

S.U.P is a health, economic & environmental scourge —

### Health

- production causes release of greenhouse gas, global warming and depletion of ozone
- often SUPs are "burnt" off at incinerators  
↳ toxic fumes → respiratory problems
- Plastics also have chemicals  
↳ eg: toiletries have triclosan  
↳ BPA - hormonal changes in humans  
↳ pre-puberty mensturation in young girls



### Economic

- unscientific methods of disposal → affects human productivity
- chokes drains → causes flooding and inundation → damage to infrastructure

### Environmental

- Chokes marine life  
eg: - straws stuck inside turtle's nostrils  
- jelly fish mating with a polythene bag  
- plastics even found at manana trench
- Does not degrade, solid waste bio-accumulation
- Broken down into microplastics, ingested by organisms  
L eg: report suggesting humans consume a credit card's weight of plastic every year
- Chemicals leach into the environment
- Production emits greenhouse gases

There is a need for governments, businesses and individuals to play their part

- Governments : effective implementation of Single Use-Plan ban under Plastic Waste

Management Rules, 2021

- Incentivise adoption of alternative technologies  
 eg: L tax breaks, tax exemption to companies manufacturing bamboo products

**Businesses** - come up with creative solutions to deal with costly inputs  
 L Producers Follow Extended Producer Responsibility  
 L Incentivise Deposit Refund Scheme

Eg:- Small incentives like <sup>+</sup> free vegetables if a customer carries own jute bag

**Individuals** - need to act, follow rules and regulations

- L 4R principles - reduce, reuse, refuse, recycle } the plastic waste

There is a need to follow "Lifestyle for Environment" (LIFE) and to bring behavioural change in consumers.  
 Himachal Pradesh fought the menace by paying ₹ 75/kg in schools to students who for collecting SLPs and used it to build roads. Such solutions need to be found for the entirety of India.

**Feedback**

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Structure/ Presentation
Question Interpretation
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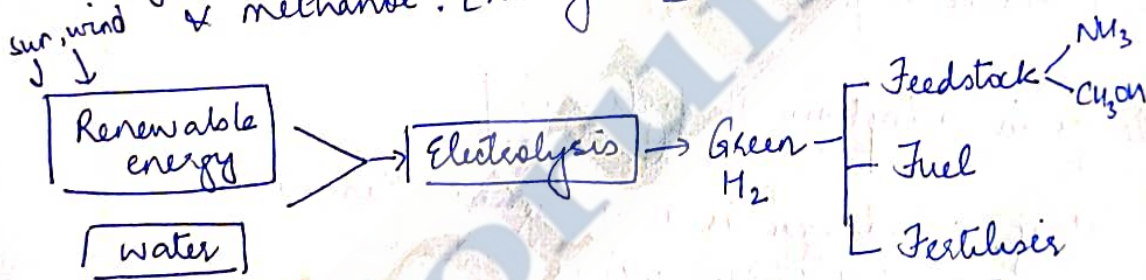


**Q.15)** Green hydrogen can be the engine of a sustainable economy, but it would require crossing financial and technological barriers. Discuss the reasons for increasing interest in green hydrogen and challenges in its adoption as the fuel of the future. (15 marks, 250 words)

ग्रीन हाइड्रोजन एक स्थायी अर्थव्यवस्था का इंजन हो सकता है, लेकिन इसके लिए वित्तीय और तकनीकी बाधाओं को पार करना होगा। ग्रीन हाइड्रोजन में बढ़ती रुचि के कारणों और भविष्य के ईंधन के रूप में इसे अपनाने में चुनौतियों की चर्चा करें। (15 अंक, 250 शब्द)

Green Hydrogen is the hydrogen produced through electrolysis of water using electricity from renewable energy sources. It has a near-zero carbon footprint.

At present, India consumes 6 million tonnes of hydrogen per year to manufacture for ammonia & methanol. [not green]



Reasons for increasing interest in Green Hydrogen

1. Hydrogen as a fuel

- very high calorific value
- very high energy density
- next to none emissions
- by product is water

2. Weaponisation of supply chain and energy in the present global order

eg: Russia cutting off Europe's gas supply  
 - Hydrogen is freely available

### 3. Net zero targets

- L countries submitted net zero targets (NDCs)
- L India needs to reduce emission intensity by 45% (new NDCs for COP 26)
- L  $H_2$  can help meet these targets

4. Non-polluting, no respiratory or health risk from usage.

5. Help reduce current account deficit, save forex and improve fiscal situation.

### Challenges in adoption of hydrogen

1. Safety - hydrogen is very highly inflammable and highly energy dense  
 L slight leak can be disastrous
2. Infrastructure - refuelling hydrogen <sup>fuel</sup> needs hydrogen stations / centers → unavailable at present
3. Production is costly - the safe technology is expensive
4. Uneconomical for everyday use  
 L out of common man's reach



- Transportation from one place to another
  - L no smell → leak detection difficult
  - L huge safety risks in all modes of transport.
- Extraction / Electrolysis is an energy intensive process.

Despite the challenges, the world is moving forward to embrace hydrogen as the fuel of the future. Germany recently flagged off locomotive run on hydrogen fuel. India too has launched National Hydrogen Energy Mission and is on a path to Hydr adopt hydrogen in near future.

**Feedback**

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Structure/ Presentation
Question Interpretation
Content
Value Addition
Total

Q.16) Making the invisible groundwater visible is critical for building climate resilience and achieving sustainable development goals. Examine. (15 marks, 250 words)

अदृश्य भूजल को दृश्यमान बनाना जलवायु को लचीलापन बनाने और सतत विकास लक्ष्यों को प्राप्त करने के लिए महत्वपूर्ण है। परीक्षण कीजिए। (15 अंक, 250 शब्द)

India is the world's largest user of groundwater. Groundwater is the freshwater available below the ~~bedrock~~ soil over impermeable rock layer, forming a column known as the water table.

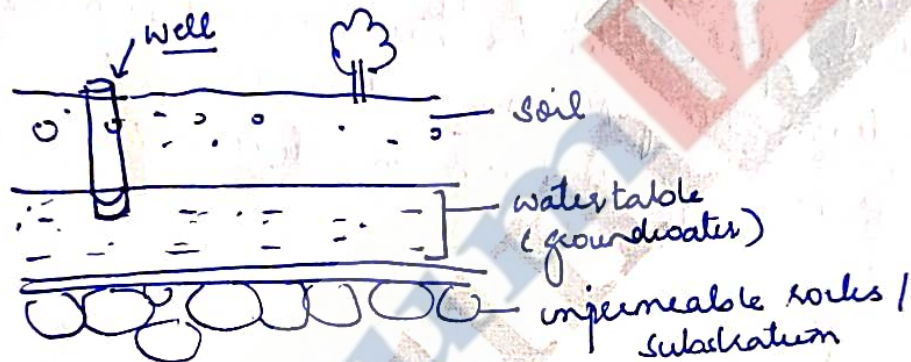


Fig: Diagram showing groundwater

Groundwater, being present under the ~~so~~ soil is largely invisible

- ↳ consequences of pollution not well known
- ↳ level of water not characterised
- ↳ pollutants from leaching of solid waste
- ↳ indiscriminate use
- ↳ ineffective laws, poor compliance

Thus making invisible water ~~is~~ visible is necessary.



(A) | Building climate resilience

India suffers a double whammy of disasters due to climate change

Increased droughts due to climate change

Concentrated, localized rainfall (75% increase)

→ Groundwater serves an effective buffer against droughts - ready source of water.

→ Rainwater harvesting, ~~water~~ planning like "buoyant buildings" and sponge cities can effectively channelise excessive water to ground

- ↳ dilution of contaminants
- ↳ increase in water level
- ↳ keeps soil strata healthy

(B) | Achieving Sustainable Development Goals

→ Provision of clean water and WASH facility → decreased disease burden healthy population (SDG 3)

→ Reduction in time poverty for women who fetched water from long distances

- ↳ SDG-45 - Gender equality
- ↳ reduction in poverty (SDG-1)

- Directly meets SDG-6 - Clean water and sanitation.
- Help build sustainable and climate resilient cities : SDG-11

According to NITI Aayog's report, 70% <sup>fresh</sup> water in India is contaminated. India is also a net virtual water exporter (1kg rice → 2500 L water).

The need is to develop sustainable cropping patterns, to recycle waste water and create awareness about water as a resource. Mihir Shah committee <sup>recommendations</sup> would serve as a good starting point.

**Feedback**

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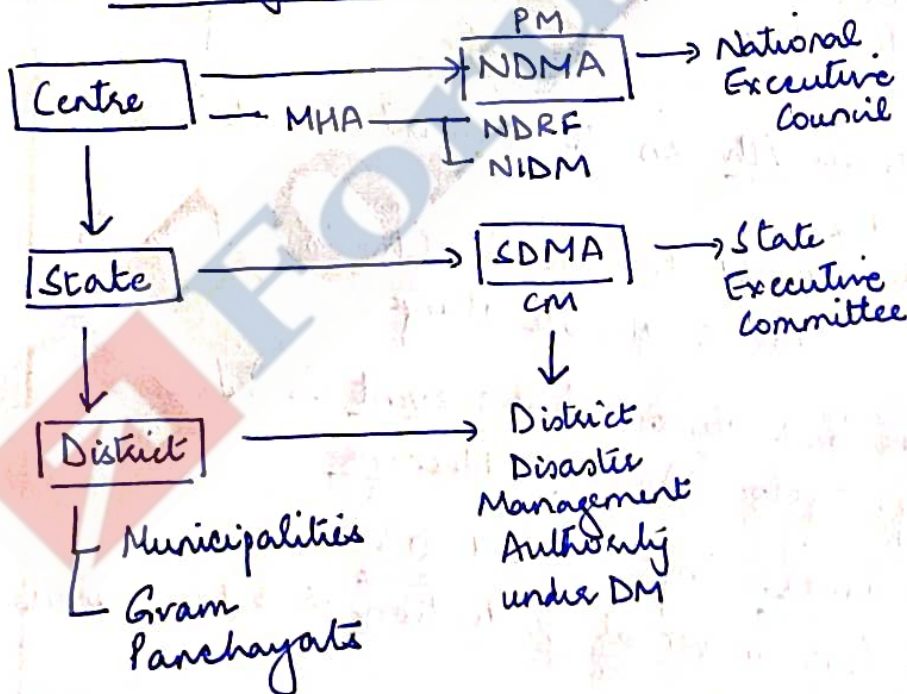
Q.17) Despite the presence of a strong institutional framework and clearly stated policy, huge losses in terms of human, financial, environmental and livelihood show that India still struggles in effective management of disasters. Discuss the reasons for the gap between policy and practices related to disaster management in the country. (15 marks, 250 words)

एक मजबूत संस्थागत ढांचे और स्पष्ट रूप से बताई गई नीति की उपस्थिति के बावजूद, मानव, वित्तीय, पर्यावरण और आजीविका के मामले में भारी नुकसान दर्शाता है कि भारत अभी भी आपदाओं के प्रभावी प्रबंधन में संघर्ष कर रहा है। देश में आपदा प्रबंधन से संबंधित नीति और उनके कार्यान्वयन के बीच अंतर के कारणों की चर्चा करें। (15 अंक, 250 शब्द)

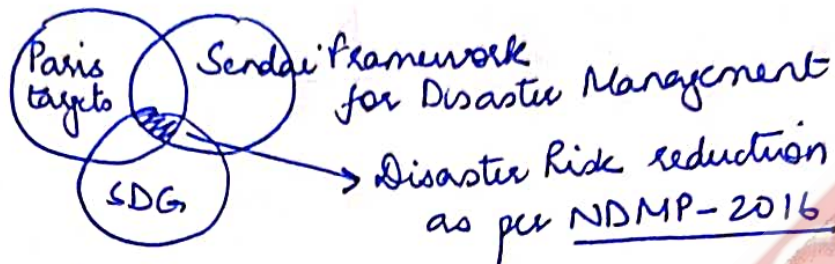
65% of country is vulnerable to single or multiple disasters. The country suffers an economic loss equal to 2% of GDP each year. Effective management of disasters thus becomes essential.

### Strong Institutional framework for Disaster Management

Disaster Management Act 2005 proposes a 3-tier structure



India also has an effective National Disaster Management Plan 2016 (NDMP)



It aims to increase

- ~~ster~~ understanding dis. of disaster risk
- improving disaster risk governance
- investing in disaster resilience
- Enhancing disaster preparedness for effective response and to build back better

However, India still suffers losses due to disasters

- India ranked 7th on Germanwatch's Climate Risk Index
  - ↳ threat to life, livelihoods and assets due to climate change
- Disaster is a chronic calendar event in India
  - ↳ eg: cyclone Amphan, Nicarga
- Heat waves days crossed 203
  - ↳ loss in wheat production in this calendar year
- Urban floods cause destruction to the tune of ₹1805 crore.



Reasons for gap between policy and practices related to Disaster Management :

- Weak compliance of policies  
eg: NDMA framed guidelines on Glacial lake outburst floods → no action until Chamoli floods
- Fund mobilisation  
↳ no funds for National Disaster Mitigation Fund under NDMA
- Lack of trained manpower
- Infrastructure gaps — building codes not complied with  
↳ poor inspection regime
- No specific targets for in National Disaster Management Plan
- lack of awareness and community-based planning

Disaster dilutes the development gains. While there has been a shift in planning approach, there needs to be a similar shift towards proactiveness towards disaster risk mitigation so as to meet SDG 11: making cities safe & resilient.

**Feedback**

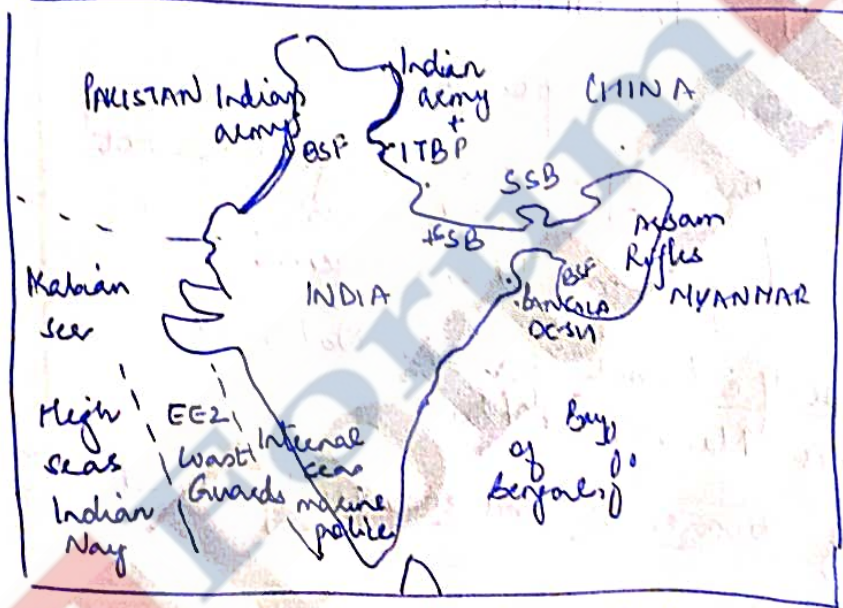
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Structure/ Presentation
Question Interpretation
Content
Value Addition
Total

**Q.18)** Present a brief account of various security forces deployed to protect India's terrestrial and maritime borders. Also, bring out various challenges faced by border security forces and suggest measures to effectively address them. (15 marks, 250 words)

भारत की स्थलीय और समुद्री सीमाओं की रक्षा के लिए सैन्य विभिन्न सुरक्षा बलों का संक्षिप्त विवरण प्रस्तुत करें। साथ ही, सीमा सुरक्षा बलों के सामने आने वाली विभिन्न चुनौतियों को सामने लाएं और उन्हें प्रभावी ढंग से संबोधित करने के उपाय सुझाएं। (15 अंक, 250 शब्द)

India has 15,106 km of land/territorial border and around 7500 km of maritime border and is thus highly vulnerable to external security challenges.



Map - Security forces deployment

Role of Security forces

Terrestrial borders

- Indo Tibetan border police (ITBP) - mans border outposts at ~~the~~ Ladakh (India - China border)

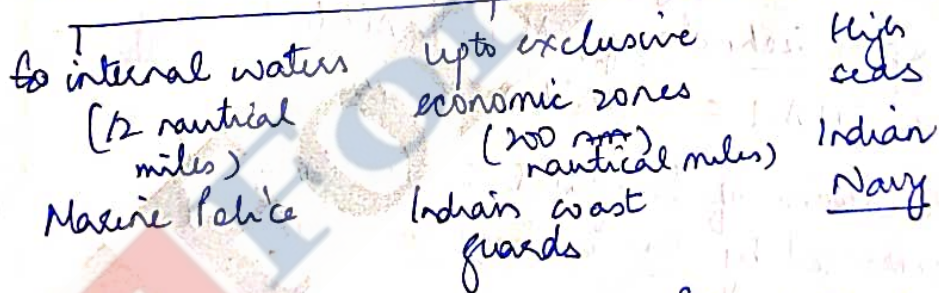


- Indian army - mans India-Pakistan, India-China border, first line of defence at all borders
- ~~Ind~~ Shasastka Seema Bal (SSB) - North India borders with Nepal, Bhutan
- Border Security Force (BSF) - 50km ~~km~~ from with the border in border states.  
 eg: West Bengal, Punjab  
 - check infiltration + smuggling - <sup>drugs</sup> arms, <sup>cattle</sup>
- Assam Rifles - protection of North East states  
 - counter insurgency

Challenges faced by security

Maritime borders

3 layered architecture



- Indian ~~army~~ air force coordinates both a terrestrial and maritime border protection.

Challenges faced by security forces

- Rugged terrain, difficult surveillance
  - Hilly areas / Himalayas in the North and North East
  - creeks, bays, estuaries in coastal areas

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# Forum IAS

- Infiltration by terrorists - Jammu & Kashmir  
 ↳ coasts ↳ of 26/11 terrorists
- Smuggling
  - ↳ Drugs } Punjab, J&K, Uttarakhand
  - ↳ Arms } ↳ Nepal
  - ↳ Gold ↳ Nepal border
  - ↳ Cattle - Bangladesh border
  - ↳ Maritime borders
- Illegal migrants - Sri Lankans, Tamils, Rohingyas, Muslims etc.

## Measures to address security challenges

- Use of technology for effective surveillance
- Development of border villages and last mile connectivity  
 eg: Vibrant Villages Scheme
- Use of space technology, Medium Altitude Long Endurance (M.A.L.E - UAVs) drones
- Border creation of Integrated Theatre Commands as envisaged by Kargil Review Committee and Shekhar committee.

The Russia Ukraine crisis has ~~proved~~ <sup>shown</sup> the importance of defence upgradation and security architecture if the neighbours are hostile. India is sandwiched between China and Pakistan and needs to pay special attention to protect the integrity of its border.

### Feedback (For OFFICE use only)

Structure/ Presentation
Question Interpretation
Content
Value Addition
Total



Q.19) In what ways management of maritime borders differ from that of territorial borders? Also, analyze various vulnerabilities that arise from a large maritime boundary of the country.

(15 marks, 250 words)

समुद्री सीमाओं का प्रबंधन किस प्रकार क्षेत्रीय सीमाओं से भिन्न है? इसके अलावा, देश की लंबी समुद्री सीमा से उत्पन्न होने वाली विभिन्न सुभेदताओं का विश्लेषण करें। (15 अंक, 250 शब्द)

India has a 7500 km long coastline and 9 coastal states.



Management of maritime borders differs from that of territorial borders as -

Territorial border	Maritime
- Physical demarcation of India's land possible	- No physical demarcation of maritime boundary
- Laying down fences, border surveillance using post cameras	- marked by <del>geo</del> latitudinal & longitudinal coordinates
- No extension of land boundary	- Extends from internal waters to territorial sea,

- A specialised security force is enough  
eg: Assam Rifles in North East

allowed usage of "exclusive economic zone"

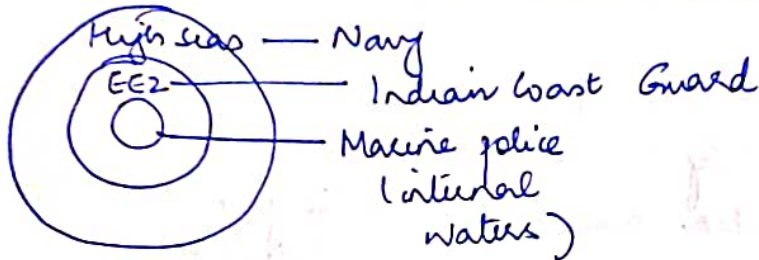
- Need for different security forces at different ranges due to different class of vessels  
eg: marine police  
Indian coast guards  
Indian Navy

Security challenges in maritime borders:

- Illegal Infiltration by terrorists  
eg: 26/11 terrorists entered via sea
- Illegal smuggling of drugs  
↳ India serves as transit point
- Illegal migration eg: Sri Lankan Tamils
- Smuggling of firearms  
↳ eg: used in 1993 Mumbai blasts
- Coastal piracy and armed robbery in Indian Ocean region. eg: at Somalian waters
- Human trafficking  
eg: Trafficking of young girls to middle eastern countries



Security architecture for coastal regions



- Kreation of Sagar Suaksha Dal - fishermen as informants
- ID registration of fishermen
- Exercises - Sea Vigil, Kavach, SIMBEX

India's approach towards coastal and maritime security is reflected in the vision of "SAGAR" - Security and Growth for All in the Region, and aims to create Indian Ocean Region as "zone of peace".

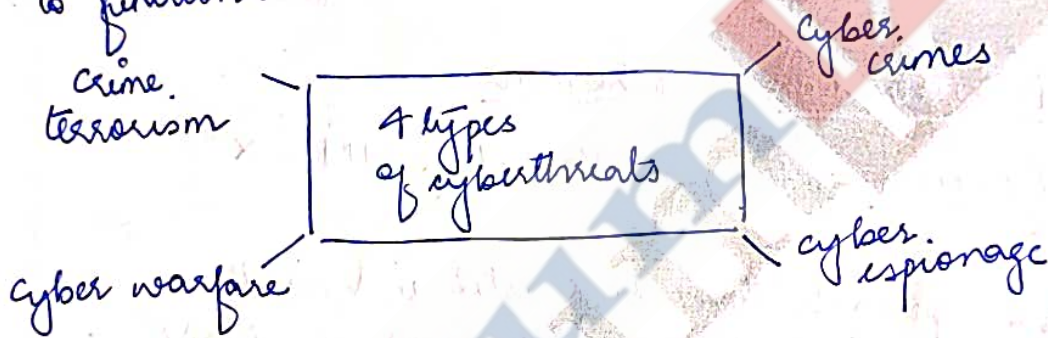
**Feedback**  
(For OFFICE use only)

Structure/ Presentation
Question Interpretation
Content
Value Addition
Total

Q.20) Cyberthreats can wage a dual war on the state and citizens, disrupting the national security as well as social stability. Explain. (15 marks, 250 words)

साइबर धमकी राज्य और नागरिकों पर दोहरा युद्ध छेड़ सकती है, जिससे राष्ट्रीय सुरक्षा और सामाजिक स्थिरता बाधित हो सकती है। व्याख्या कीजिए। (15 अंक, 250 शब्द)

Cyberthreats are security challenges that aim to access, use, ~~destroy~~ disclose or destroy information, resources, devices, equipments that use internet to function.



~~Cyber~~ Cyberthreats can wage a war on state

- Cyber terrorism - state's critical infrastructure is attacked  
eg: Shadowpad → India's electricity outage in Mumbai
- Cyber warfare - access, destruction of state's cyber facilities for military or strategic purposes  
eg: Ukraine's retaliation on Russia → "Frozen war"
- cyber espionage - ~~is~~ on important personalities ~~and~~ agencies



## Cyber threats wage a war on citizens

- cyber crimes like cyber theft, fraud, cheating online

↳ use of social media: creation of fake shopping sites,

- clickbaiting (offers)

- Circulation of morphed pictures

↳ communal clashes eg: violence in Bangalore

- Pornography, ~~sex~~

↳ stress and effect - something that gets popularity when you try to suppress it.

## Disruption of national security and social stability

cyber terrorism, warfare, espionage

→ state's assets compromised

→ Disruption in key services

Threat to national security (both internally & externally)

Banking & Finance

Electricity

Energy, power

Satellite communication

Threat to social security & stability

↳ instability, inconvenience to people

↳ resources compromised & vulnerabilities exposed

### Internal threats

- ↳ no communal clashes, riots
  - ↳ disruption of key services - payment, billing etc
  - ↳ frustration among general public
    - ↳ ~~no~~ violence
- of: Sri Lanka

### External Threats

- ↳ resources are compromised, vulnerabilities exposed
- ↳ exploited by state actors (China, Pakistan intelligence)
- ↳ exploited by non-state actors (over ground workers, hybrid militants, organised crime syndicates).

### Steps to tackle

- Tallin Manual - for international cooperation
- Setting up backup plan and mock cyber drills
  - ↳ plan of action if an asset is compromised
- Creating a dedicated cyber theatre command (Shaktikas committee)
- Electronic surveillance over dark web and data leaks.

The need is to jointly come up with an international convention against cyber crime since the nature of these attacks are often dispersed, transnational and prosecution is difficult otherwise.