

Time taken - 3 hours 45 min

NEXT IAS

MAIN TEST SERIES 2024 (SLT)

(To be filled by candidate)

TEST CODE : SLT006

TEST NO. : 06

(Please write test code printed on Question Paper)

Name of Candidate: Chiranshu Taneja Mobile No.

Roll No.: MT24SLTON011 Start Time End Time

Date of Examination: 14/09/2024 Medium : English Hindi

Q.No.	Maximum Marks	Marks Obtained
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
10	10	
TOTAL MARKS - 100		

Q.No.	Maximum Marks	Marks Obtained
11	15	
12	15	
13	15	
14	15	
15	15	
16	15	
17	15	
18	15	
19	15	
20	15	
TOTAL MARKS - 150		

GRAND TOTAL :/250

EVAL CODE: EVAL DATE:

GENERAL INSTRUCTIONS

- Immediately on receipt of the QCA booklet, please check that this QCA booklet does not have any misprint or torn or missing pages or items, etc. If so, get it replaced by a fresh QCA booklet
- Candidates must mention all relevant details like Name, Email, Roll No, Mobile, etc. in the space allocated.
- Candidate is expected to attempt all 20 questions within the given timeline.
- Answers must be written in the medium authorized at the time of admission.
- Candidates must write answers for the specific question under the respective question itself. Any answer written outside the space allotted may not be given credit.
- Please write neatly. Avoid illegible writing.
- Do not write/mark irrelevant matters in the QCAB.

सामान्य निर्देश

- QCA पुस्तिका प्राप्त होने पर कृपया तुरंत जांच लें कि इस QCA पुस्तिका में कोई पृष्ठ या सम्मग्री आदि गलत छपी हुई या फटी हुई या गायब तो नहीं है। यदि ऐसा है, तो इसे एक नई QCA पुस्तिका से बदल लें।
- अभ्यर्थियों को सभी प्रासंगिक विवरण जैसे नाम, ईमेल, रोल नंबर, मॉबाइल नंबर आदि का आवंटित स्थान पर उल्लेख करना होगा।
- अभ्यर्थियों से अपेक्षा की जाती है कि वह आवंटित समय-सीमा के भीतर ही सभी 20 प्रश्नों के उत्तर-लेखन का प्रयास करें।
- प्रत्येक उत्तर, प्रवेश के समय चुनी गयी भाषा के माध्यम में ही लिखे जाने चाहिए।
- अभ्यर्थियों को विशिष्ट प्रश्न के उत्तर संबंधित प्रश्न के नीचे ही लिखने होंगे। आवंटित स्थान के बाहर लिखे गए किसी भी उत्तर को क्रेडिट नहीं दिया जाएगा।
- कृपया साफ-सुथरा लिखें। अपठनीय लेखन से बचें।
- QCAB में अप्रासंगिक तथ्यों को न लिखें / न ही चिह्नित करें।

REMARKS:

<u>Student Concerns / Query</u>	<u>Evaluator's Feedback / Response</u>
1	1
.....
.....
.....
.....
2	2
.....
.....
.....
.....
3	3
.....
.....
.....

<u>MARKING SCHEME *</u>			
Marks Per Ques	Below Average	Average	Above Average
10 Marks	Below 3.00	3.00 - 3.75	4.00 and above
15 Marks	Below 4.50	4.50 - 5.75	6.00 and above

* Subject to change without prior notice.

IMPORTANT QR CODES

 <p>Topper's Copy</p>	 <p>- Common mistake and Correct Filled QCAB</p>
 <p>Copy Scanner App</p>	 <p>Next IAS Test Centre Location</p>

MACRO COMMENTS

The Purpose of evaluation@nextias.com is to provide constructive suggestions on 'How to improve Answer Writing and thereby score better marks.

STRENGTHS OF THE CANDIDATE

AREAS OF IMPROVEMENT



IMPROVEMENT SUGGESTIONS

- Q.1 भारत को एक सतत हरित अर्थव्यवस्था बनाने में जैव-विनिर्माण (Biomanufacturing) और जैव-फाउंड्री (Bio-foundry) की संभावनाओं का मूल्यांकन कीजिए।
Evaluate the potential of biomanufacturing and bio-foundry in driving India's future towards a sustainable green economy. (10 अंक, 150 शब्द)
(10 marks, 150 words)

Biomanufacturing and bio-foundry,
backed by biotechnological advancements,
can be potential drivers of Indian agri-
cultural and green economy.

Opportunities

- ↳ India is currently dependent on imports for GM seeds it uses. Domestic facilities can reduce this burden
- ↳ Biomanufacturing also plays a big role in medical treatment and disease diagnostics
- ↳ Biofoundries can be encouraged to contribute in bioremediation of degraded soil, making the ecosystem sustainable
- ↳ They can be employed in carbon sequestration efforts by highly

polluting industries; thereby greening
the economy

↳ Use of specially designed organisms
can help solve problem of solid waste
management in municipalities.

Challenges

↳ Funding: It is difficult to get
investors in these emerging fields in India

↳ Technology: The plants setup to
biomanufacture products require special
equipments and technology that has to be
imported

↳ Skilled workforce: Lack of highly skilled
labour in this sector

↳ Risks of potential misuse has kept
the authorities over-cautious.

Recently, Govt. launch Bio3E - (biotech
for environment, economy, employment) to
promote these technologies because of
their high potential.

- Q.2 पुनः प्रयोज्य प्रक्षेपण यान (RLV) की कार्यप्रणाली के पीछे क्या सिद्धांत हैं? भारत के अंतरिक्ष वाणिज्य में आर.एल.वी. के उपयोग के महत्व और संभावित लाभों की व्याख्या कीजिए। (10 अंक, 150 शब्द)
What are the principles behind the working of Reusable Launch Vehicle (RLV)? Explain the significance and potential benefits of the use of RLVs in India's space commerce. (10 marks, 150 words)

Reusable Launch Vehicle (RLV)

refers to a rocket/launch vehicle, used to carry satellite to outer space, that has the capability to reenter the atmosphere and land at a predecided location without burning up, thereby allowing reuse.

Principles behind working of RLVs

- 1) They are designed with extra fuel and maneuver capability that allows them to re-enter.
- 2) Use of de-accelerators during re-entry to control speed
- 3) Outer-body is made fire-resistant
- 4) Re-entry controlled through base-station
- 5) Usually land on ships/oceans.

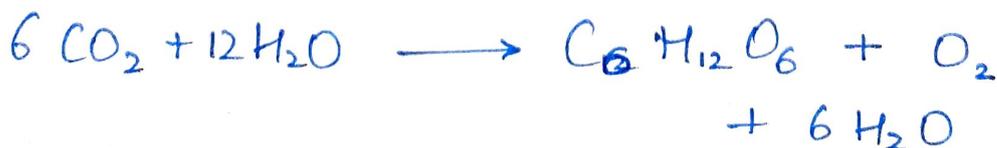
Q.3

आंध्र प्रदेश में भारतीय लॉरेल वृक्षों (Indian Laurel trees) की खोज ने पेड़ों में पानी को संग्रहीत करने और छोड़ने (store and release) की क्षमता में वैज्ञानिकों की रुचि जगाई है। इस संदर्भ में, पेड़ों में जल परिवहन और भंडारण (transportation and storage) की प्रक्रिया के पीछे के विज्ञान की व्याख्या कीजिए। (10 अंक, 150 शब्द)
The discovery of Indian Laurel Trees in Andhra Pradesh has sparked the interest of scientists in the capacity of trees to store and release water. In this context, explain the science behind the process of water transportation and storage in trees. (10 marks, 150 words)

Trees have enormous potential to store not just carbon, nutrients and cellulose but also water as highlighted by Laurel Trees of Andhra Pradesh.

Science behind process of water transportation and storage

- 1) Trees get most of their water requirements fulfilled through roots.
- 2) Water moves from roots to stem and branches and reaches leaves through the xylem network.
- 3) Photosynthesis occurs in leaves due to presence of chlorophyll.



- 4) The extra H₂O molecules formed are trapped between glucose molecules
- 5) This is one of the ways in which water is stored.
- 6) If photosynthesis doesn't happen, water will remain stored in the trunk.
- 7) Capillary action is responsible for loss of water by upper parts through transpiration.

Trees like Indian Laurel, which have high water storing capability, should be promoted in afforestation campaigns along degraded lands.

Q.4

सैन्य क्षेत्र में जिम्मेदार कृत्रिम बुद्धिमत्ता पर हाल ही में आयोजित वैश्विक शिखर सम्मेलन (आरईएआईएम, 2023-
responsible artificial intelligence in the military domain) ने सैन्य अनुप्रयोगों में कृत्रिम बुद्धिमत्ता के
उपयोग से जुड़े अवसरों, चुनौतियों और जोखिमों को प्रदर्शित किया। इस संदर्भ में, रक्षा और सैन्य अनुप्रयोगों में कृत्रिम
बुद्धिमत्ता के प्रभाव का आलोचनात्मक विश्लेषण कीजिए। (10 अंक, 150 शब्द)

The recently conducted global Summit on Responsible Artificial Intelligence in the Military
Domain (REAIM, 2023) showcased the opportunities, challenges and risks associated with
the use of Artificial Intelligence in military applications. In this context, critically analyse the
impact of Artificial Intelligence in defence and military applications. (10 marks, 150 words)

Artificial Intelligence, backed by
machine learning and neural networks
has the potential to revolutionize the
defence industry and militaries across
the world.

Opportunities offered by AI

- 1) Use of AI in unmanned aerial vehicles to fight in enemy's territory
- 2) Using robots, based on AI, in the battlefield instead of humans, thus saving lives
- 3) Cyber offensive capabilities can be increased multi-fold through AI incorporation
- 4) Using AI to detect unusual activity

on borders, thereby improving reconnaissance
5) Use of AI to track financial transactions to spot money laundering

Challenges posed by AI

- 1) Difficult to predict its decisions with certainty
- 2) Ethical concerns about use of AI robots on battlefield.
- 3) We are witnessing a sharpening AI-divide across militaries, which can lead to unequal power distribution

Risks associated with AI

Open AI academics have highlighted the risks saying "we are building the plane as it is going down - the runway." AI in military poses danger of future conflict between AI and humans, with losing control.

Thus, it is pertinent to establish international consensus to limit use of AI in militaries

Candidates must
write on this margin

Q.5

भारतीय सशस्त्र बलों द्वारा हाल ही में तैयार किए गए 'साइबर-अंतरिक्ष अभियान (Cyberspace operations) के लिए संयुक्त सिद्धांत' से पारंपरिक ऑपरेशनों के साथ-साथ ग्रे जोन युद्ध दोनों के लिए साइबर-सुरक्षा स्थिति मजबूत होगी। परीक्षण कीजिए। (10 अंक, 150 शब्द)

Recently formulated 'joint doctrine for cyberspace operations' by Indian armed forces will lead to the strengthening of the cyber-security posture for both conventional operations as well as grey zone warfare. Examine. (10 marks, 150 words)





next ias

Q.6

पाकिस्तान और बांग्लादेश से सटे राज्यों में सीमा सुरक्षा बल (BSF) के प्रादेशिक क्षेत्राधिकार के विस्तार की आवश्यकता एवं संभावित मुद्दों पर चर्चा कीजिए।
Discuss the necessity and potential issues surrounding the extension of the Border Security Force's (BSF) territorial jurisdiction in states adjacent to Pakistan and Bangladesh.
(10 marks, 150 words)

Government of India has extended the jurisdiction of BSF upto 50km from the borders where it acts as the border guarding force.

Necessity of the extension

- ↳ Drone attacks in Jammu airbas
- ↳ Use of drones along Punjab border to send drugs and weapons
- ↳ Illegal immigration and cattle smuggling along Bangladesh border
- ↳ Illegal drug trade being promoted, highlighting narcoterrorism in border areas
- ↳ Rise of separatist elements in Punjab border areas and foreign actors fomenting the fire

↳ Efforts by Pakistan to tackle strong counter-infiltration grid in kashmir by sending proxy groups through Jammu border

Potential issues surrounding extension

↳ Federal issue: Law and order is primary responsibility of state government, even if it is a border state.

↳ Conflict between BSF and state police

eg both BSF and Punjab police getting involved in drug ^{racket} cases in Punjab

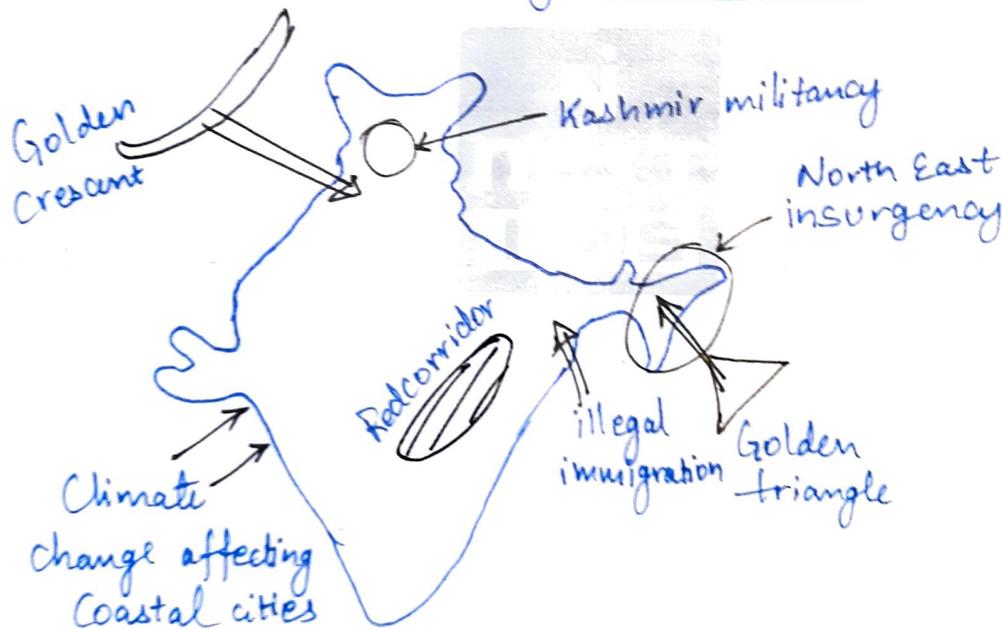
However, over the last year, these issues have got sidelined as there is consensus on tackling drone warfare by the western neighbour. It is therefore crucial that BSF stands up to its responsibility, which would require cooperation with state police forces.

Q.7

राष्ट्रीय सुरक्षा के लिए खतरे धीरे-धीरे "भौगोलिक" से "विषयगत" (thematic) में बदल गए हैं। इस संदर्भ में, आंतरिक सुरक्षा की समकालीन चुनौतियाँ (contemporary challenges) क्या हैं और ऐसी चुनौतियों से निपटने के लिए क्या उपाय किए जा सकते हैं? (10 अंक, 150 शब्द)

The threats to national security have gradually transformed from being "geographic" to being "thematic". In this context, what are the contemporary challenges of internal security and what measures can be undertaken to deal with such challenges? (10 marks, 150 words)

India faces a myriad of internal security challenges because of volatile politics in neighbourhood, imbalanced regional growth and unemployment. Combined with rising polarisation.



- 1) Drug menace and its use in narcoterrorism
- 2) Polarisation and underdevelopment fuelling religious extremism
- 3) Unemployment and alienation leading

- to left-wing extremism
- 4) Illegal immigration and Rohingya Issue
 - 5) Non-traditional security threats like Climate change affecting coastal communities
 - 6) Cyber attacks and warfare by adversaries

Measures to deal with them

- 1) Inclusive growth to tackle alienation with 'Sabka Saath Sabka Vikas'
- 2) Border Management → CIBMS, BOLD-QIT
- 3) Using AI to track and counter money laundering and terror finance
- 4) Bringing in civil society to curb drug consumption
- 5) Environment-friendly development
- 6) Cyber offensive capabilities to counter cyber warfare

India needs focus on these thematic issues to better tackle the rising security challenges

Q.8

भारत के सीमा सुरक्षा ढांचे को मजबूत करने और सीमा पर खतरों से निपटने में उन्नत सीमा निगरानी प्रौद्योगिकियों (enhanced border surveillance technology) की भूमिका का मूल्यांकन कीजिए। (10 अंक, 150 शब्द)
Evaluate the role of enhanced border surveillance technologies in bolstering India's border security framework and addressing cross-border threats. (10 marks, 150 words)

Border Surveillance Technologies

involve creation of smart borders and fencing to track unusual activities and curb infiltration and illegal immigration

India has recently deployed CIBMS

Comprehensive Integrated Border Management System and BOLT-QIT technology along its borders with Pakistan and Bangladesh

Role of border surveillance technologies

- 1) Control infiltration through porous borders by using thermal cameras
- 2) Ensure quick response through alerts and warnings using AI
- 3) Curb the menace of drones being used to send illegal weapons and

drugs through automated anti-drones
missiles

4) Save human resource and deployment
by keeping track over large areas

eg in Rajasthan

5) Contribute in analysis of data and
bolster ability to predict border issues

eg US through surveillance of Russia-
Ukraine border, was able to predict invasion

6) Keep check on underground tunnels
through radar imaging

7) Help keep vigilance on ^{cross} border infrastructure
especially on India-China border

8) Prevent skirmishes on borders through
camera-recordings and alerts to bordering
Country.

Use of these new-age technologies will
go a long way in establishing safe
borders and address cross-border threats

- Q.9 पिछले दशक में हीट वेव की बढ़ती गहनता, आवृत्ति और अवधि के मद्देनजर, क्या "हीट वेव" को अब आपदा प्रबंधन अधिनियम, 2005 के तहत एक अधिसूचित आपदा के रूप में शामिल किया जाना चाहिए? (10 अंक, 150 शब्द)
In light of the increased intensity, frequency and duration of heat waves in the last decade, do you think the time has come to include "heat waves" as a notified disaster under the Disaster Management Act, of 2005? (10 marks, 150 words)

While Central government has notified 12 disasters ~~as~~ under the DMA 2005, it is yet to notify "heatwaves" as natural disaster despite repeated demands.

Advantages of notifying heatwaves

- 1) States have made heat-action-plans to curb the effects of heatwaves.
- 2) These include construction of shaded spaces, availability of water coolers, proper ventilated spaces in public buildings etc.
- 3) All these require funding, which will become easier after notification
- 4) States will be able to use State Disaster Response Fund (SDRF) and the mitigation fund (SDMF) to create

special wards in district hospitals for heat-related illnesses.

5) States can also use NDRF and NDMF funds if heatwaves are unmanageable.

Challenges / Issues in notification

- 1) 15th finance commission has declined the request of state governments
- 2) Financial burden: every death due to a notified disaster mandates ₹ 4 lakh compensation
- 3) Practical difficulties: Heatwaves often worsen the condition of vulnerable population, rather than directly being responsible for death, making it difficult to ascertain the cause.

In the light of above challenges, 15th Finance Commission permitted State govts to use upto 10% of SDRF and SDMF funds for any local declared notified disaster. States should use this provision (like Haryana) to declare heatwaves locally.

- Q.10 भूस्खलन एक प्राकृतिक घटना को बजाय मानव-प्रेरित घटना बन गई है। भूस्खलन की बढ़ती घटनाओं के कारणों पर प्रकाश डालें और आपदा को कम करने के लिए क्या उपाय किए जा सकते हैं। (10 अंक, 150 शब्द)
- Landslides have become more of a human-induced phenomenon rather than a natural phenomenon. Highlighting the reasons for increasing incidences of landslides, suggest measures that can be undertaken to mitigate the disaster. (10 marks, 150 words)

Landslide refers to a mass-wasting movement of rocks, soil and debris down the slopes of mountains, usually during rainfall season, caused by both natural and anthropogenic factors.

Reasons for increasing incidences:

According to Geological Survey of India over 12% of India is landslide prone

- ① Heavy rainfall: Climate change has made rainfall less frequent but results in heavier downpours, leading to soil liquefaction.
- ② Deforestation: Construction in hilly areas removes trees which holds the soil together.
 eg → Uttarakhand highway construction

③ Tourism has led to development of facilities along slopes, increasing the burden on weak subsoil.

eg → Hotels along slopes in Himachal

④ Wrong agricultural practices which involve excessive use of fertilizers, ^{and} irrigation, rendering the soil vulnerable to erosion

⑤ Mining in hilly areas leads to weakening of subsoil structures

eg → Kerala's Wayanad

Measures to mitigate

- 1) Early Warning System eg → Kalimpong (West Bengal)
- 2) Predicting cloudbursts and preparing for evacuation
- 3) Control the deforestation along slopes
- 4) Promote eco-tourism
- 5) Encourage soil-strengthening practices

Sustainable development and planned environmentally-friendly construction is crucial to mitigate landslides.

- Q.11 भारत में कृषि उत्पादकता और खाद्य सुरक्षा बढ़ाने में नैनो प्रौद्योगिकी की भूमिका पर चर्चा कीजिए। नैनो-उर्वरकों और नैनो-कीटनाशकों के उपयोग के हाल के विकास/प्रगति और संभावित लाभों एवं जोखिमों पर प्रकाश डालिए। (15 अंक, 250 शब्द)

Discuss the role of nanotechnology in enhancing agricultural productivity and food security in India. Highlight recent developments and potential benefits and risks of the use of nano-fertilizers and nano-pesticides. (15 marks, 250 words)

Nanotechnology involves manipulation of atoms or molecules at the nanometere scale (1-100 nm) where particles exhibit strikingly unique properties, different from ones exhibited by materials in bulk.

Role of nanotechnology in agriculture

It can enhance agricultural productivity and strengthen food security in following way:

- 1) Precision Agriculture: Through use of nano-sensors, thereby optimising the use of input
- 2) Minimize fertilizer and pesticide usage because of easier absorption of nano-counterparts
- 3) Fight crop disease effectively through

targeted drug delivery mechanism

Recent developments

- 1) IFFCO cooperative launched India's first nanofertilizer: 'Nanourea', urea in liquid form
- 2) ICAR undertaking research on ~~nan~~ pesticides

Benefits of nano-fertilizer/pesticides

- 1) Lesser amounts required: Half litre of nano urea is equivalent to 45 kg sac of normal urea
- 2) Better absorption efficiency:
 - Nanourea : 85-90%
 - Normal urea : 20-30%
- 3) Lower transportation costs: As smaller amounts are required, it will

reduce the transportation cost

4) Help government save subsidy funds:

Fertilizers subsidies reached ₹ 1.75 lakh

crore in 2023. Nanofertilizers will

help reduce the burden

5) ^{Na} Biopesticides will lessen the misuse of
chemical pesticides

Risks associated with nano-fertilizer/pesticide

^{Potential}
1) Toxicity of nanoparticles necessitates
judicious use

2) Accumulation of nanoparticles in food
chain can lead to diseases in higher trophics

3) Farmers are not aware of the harmful
effects of misoveruse of nano pesticides

Considering these public health concerns,
govt. should focus on community aware
-ness along with push on nanotechnology

- Q.12 2023 का भौतिकी का नोबेल पुरस्कार क्वांटम डॉट्स के संश्लेषण की खोज के लिए एकिमोव, रुस और बावेंडी को संयुक्त रूप से दिया गया। इस संदर्भ में क्वांटम डॉट्स के अनुप्रयोगों पर चर्चा कीजिए। (15 अंक, 250 शब्द)
The Nobel Prize in Chemistry of 2023 was jointly awarded to Ekimov, Brus and Bawendi for the discovery of synthesis of quantum dots. In this context, discuss the applications of quantum dots. (15 marks, 250 words)

Quantum dots are nanoparticles or nano-crystals of the size of 1 to 100 nm which absorb light and then remit light of different color due to quantum confinement.

The color of light emitted by such quantum dots or Q-dots depends on the size of the nanocrystal. Larger the size, lower the bandgap. Hence bigger Q-dots show reddish color and smaller Q-dots emit bluish color.

Applications of Quantum Dots

- 1) Drug delivery and ^{medical} treatment: The characteristic light emitted by each

Q-dot allow their use as markers during delivery of drugs to targeted locations.

2) Display screens: Q-dots emit more vibrant colors, encouraging their use in LED screens. The TVs using Q-dots are called QLED-TV

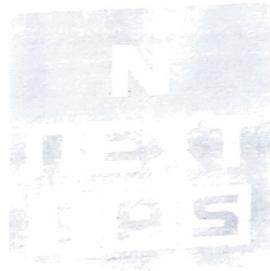
3) Flexible screens: Graphene Q-dots not only emit light but are also flexible, allowing rolled-up screens.

4) Genetic modification: Q-dots are employed in the gene modification process to act as a marker to confirm the correct delivery of foreign gene.

5) Quantum chemistry: Q-dots can help understand how quantum effects affect

Chemical reactions and their products.

Therefore, Quantum dots have varied applications from chemistry to medicine to electronics, highlighting their huge potential in revolutionizing these fields.



- Q.13 चिकित्सा विज्ञान में भारत की उन्नति, भारत की पहली कैंसर रोगी के इलाज के लिए CAR-T सेल थेरेपी का उपयोग करने में सफलता में परिलक्षित होती है। कैंसर और संबंधित बीमारियों के इलाज में बत-ज सेल थेरेपी के कामकाज और प्रभावशीलता पर चर्चा कीजिए। (15 अंक, 250 शब्द)
- India's advancement in medical science is reflected in India's success in using CAR-T cell therapy to treat the first cancer patient. Discuss the working and effectiveness of CAR-T cell therapy in treating cancer and related diseases. (15 marks, 250 words)

Cancer treatment is primarily of three types: surgery, radio-therapy and systemic therapy. One of the evolved forms of the latter is Immunotherapy.

Chimeric Antigen Receptor T-cell therapy is a type of immunotherapy.

Working of CAR-T cell^{therapy}

- ↳ CAR-T cell corresponds to a modified T-cell taken from patient's own body
- ↳ To generate cell-mediated immune response triggered by CD8 or helper T cells, patient's own T-cells

are fed back along with a CAR receptor on them which corresponds to the antigens on cancerous cells

↳ This triggers an immune response, causing killer T cells to attack the tumor by attaching the receptor to the antigen.

Effectiveness of CAR-T cell

↳ It is highly effective in case of leukemia, lymphoma and other blood-^{or lymphatic} related cancers

↳ About 85-90% got treated during trials in USA

↳ For recurring cancers, CAR-T cell therapy offers new hope

↳ However, it's effectiveness against solid tumors (lung, prostate, ovarian

(Cancers etc) is low.

↳ It can also cause side-effects affecting the lymphatic system and neurons.

↳ CAR-T cell therapy is especially useful for children witnessing relapse of cancer

While it's highly expensive (\$1 million), it is expected that the sheer size of Indian population will ensure economies of scale and bring down its cost.

The recent achievement in CAR-T cell therapy by IIT Bombay is appreciable and we need to promote more research in this nascent field to tackle the rising cancer crisis.

Q.14 भारत के गगनयान मिशन और भारतीय अंतरिक्ष स्टेशन का मुख्य उद्देश्य क्या है? किन अन्य देशों ने अंतरिक्ष में अपने मानवयुक्त मिशनों को सफलतापूर्वक लॉन्च किया है? गगनयान मिशन और उससे संबंधित भारतीय अंतरिक्ष स्टेशन के सफल क्रियान्वयन के लिए कौन सी प्रमुख प्रौद्योगिकी की आवश्यकता है? साथ ही, इन मिशनों से जुड़ी चुनौतियों को भी स्पष्ट कीजिए। (15 अंक, 250 शब्द)

What is the main objective of India's Gaganyaan Mission and Bharatiya Antariksha Station? Which other countries have successfully launched their manned missions into space? What major technologies are required for the successful execution of the Gaganyaan Mission and related Bharatiya Antariksha Station? Also, elucidates the challenges associated with these missions. (15 marks, 250 words)

ISRO is preparing to launch its first humanflight in low-earth orbit next year, under the Gaganyaan mission. And encouraged by ISRO's recent success, Indian government has asked it to work of Indian Space Station (Bharatiya Antariksha Station) by 2035.

Objectives:

Gaganyaan mission

- Prepare for sending Indians to space
- Technology demonstration to showcase ISRO's capabilities
- Learn from mission about impact of zero-gravity condition on human

health and rocket machinery through humanoid robot (Vyommitra)

Bharatiya Antariksha Station

- Ensure strategic independence
 - eg → Russia faces issues at ISS due to Ukraine conflict
- Establish India as space power
- Monitor exosphere
- Prepare for interplanetary human flight

Countries which have successfully launched manned missions into space: US, USSR, China

Technologies required:

Gaganyaan mission

- Re-entry vehicle
- Safe evacuation if launch fails
- Ensure oxygen availability for extended period
- Solid fuel boosters because of heavy payload.

Bharatiya Antariksha Mission

- Ability to send supplies regularly to space station
- Space situational awareness to prevent collision with debris

Challenges associated

Gaganyaan mission

- Re-entry into atmosphere can ignite fire
- Lack of domestic facility to train astronauts

Bharatiya Antariksha Mission

- Kessler syndrome: rising space debris which causes ISS to shift location frequently.
- Bringing back astronauts may face difficulties as recently witnessed by Sonita Williams

ISRO has made tremendous progress and these missions are natural steps in its journey. Govt. should ensure timely funding to prevent delays.

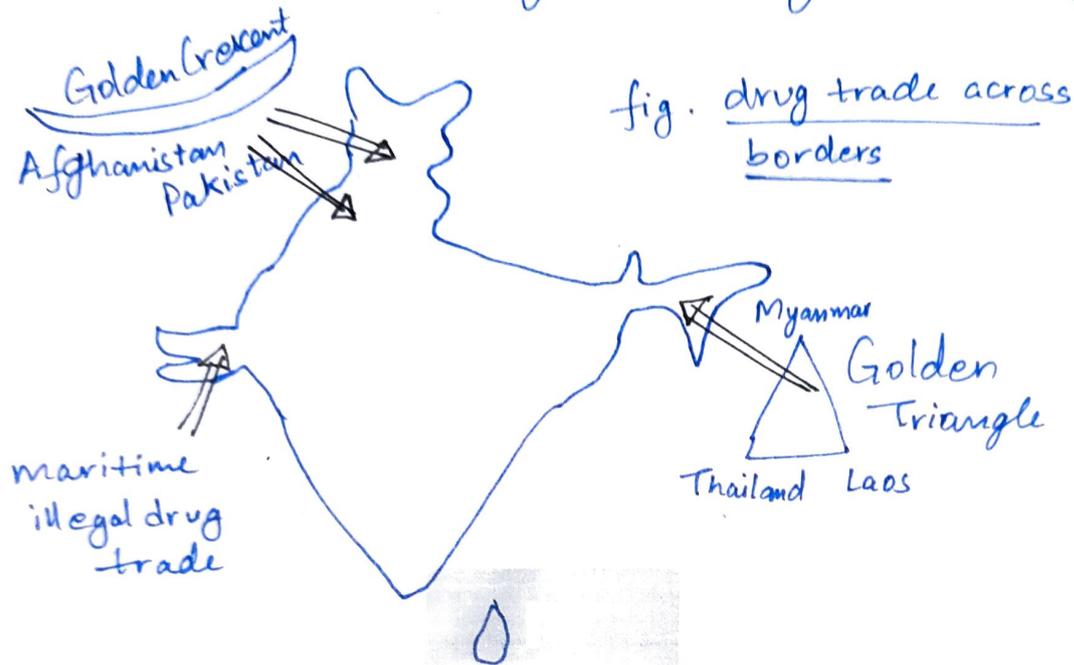
- Q.15 अंतर्राष्ट्रीय नारकोटिक्स नियंत्रण बोर्ड (INCB) रिपोर्ट 2023 दक्षिण एशिया में मादक पदार्थों की तस्करी के बढ़ते खतरे को प्रदर्शित करती है, जिसका कि भारत एक प्रमुख केंद्र है। भारत के संदर्भ में इस चुनौती के विभिन्न आयामों का विश्लेषण कीजिए। साथ ही, इससे निपटने के लिए बहु-आयामी दृष्टिकोण भी सुझाइए। (15 अंक, 250 शब्द)
- The International Narcotics Control Board (INCB) Report 2023 highlights a growing menace of drug trafficking in South Asia, with India being a major hub. Analyze the various dimensions of this challenge concerning India. Also, suggest a multi-pronged approach to address it. (15 marks, 250 words)

Recent reports from Indo-Pakistan border in Jammu and Punjab about illegal drug trade and possible narco-terrorism has raised concerns in India, which have also been highlighted in INCB Report 2023.

Challenges posed by drug trafficking

- 1) Drug Abuse: Rise in consumption of drugs in hilly areas of Himachal Pradesh and valley of Kashmir by the unemployed youth by Pakistan.
- 2) Narco-terrorism: Use of proxy groups to bypass the strong counter-infiltration grid setup by security forces, to send illegal drugs and finance terrorism.

- 3) Porous borders and free movement regime have allowed drug trafficking in North East



- 4) Unemployment: Most of these trafficking gangs lure unemployed youth into their trap and then use them to widen their network, promising them money in return

Multi-pronged strategy to combat it

- 1) Anti-drone warfare to stop drug-laden drones from western border
- 2) Combat narco-terrorism through raids and fast investigation by NCB and NIA

- 3) Plug the gaps in porous borders through Comprehensive Integrated Border Management System and BOLD-QIT
- 4) Tackle the underlying vulnerability - unemployment through skill development and rozgar melas
- 5) Start a 'Jan Andolan' to bring civil society together in this fight
- 6) Implement measures under 'Nasha-mukt Bharat Abhiyaan' on war-footing
- 7) Special de-addiction ^{centres} ~~wards~~ in district hospitals as started by Punjab Govt.

Former Jammu and Kashmir DGP Dilbag Singh emphasized that drug menace is a bigger threat than militancy. Need of the hour is to spread community awareness and follow the multi-pronged approach.

- Q.16 वामपंथी उग्रवाद के प्रति भारत की प्रतिक्रिया (कारवाई) में नक्सलवाद के मूल कारणों को दूर करने के लिए कठोर सुरक्षा उपायों के साथ-साथ सामाजिक-आर्थिक नीतियों और संवाद जैसे नरम दृष्टिकोणों/उपायों (Soft approaches) को एकीकृत करने की आवश्यकता है। चर्चा कीजिए। (15 अंक, 250 शब्द)
India's response to left-wing extremism needs to integrate soft approaches like socio-economic policies and dialogue along with hard security measures to address the root causes of Naxalism. Discuss. (15 marks, 250 words)

In the past 14 years, left-wing extremism has drastically declined in (LWE) India owing to the twin approach of the government.

The number of LWE affected districts has come down from 126 to 38, violent incidents have decreased by 80% and casualties of security forces have declined by 60% in 2010-2024 period.

Soft Approaches ⁱⁿ of India's response

1) Focus on infrastructural development in the region.

eg) road network of 13,000 km in LWE affected districts (11,000 km built post 2010)

2) Allowing naxalites to join back

mainstream society through incentives
and reintegration

eg credit facilities to start ^{small} ~~self~~-business

- 3) Ensuring connectivity and better communications by installing mobile towers
- 4) Holding negotiations with naxalite groups to give up violence
- 5) Address alienation through inclusive development
- 6) Constructing Eklavya Residential Schools for tribal children
- 7) PESA Act 1996 which empowered the Gram Sabha and prevented land acquisition without their consent.
- 8) Forest Rights Act 2006 to address demands of forest dwellers

Hard Security measures

- 1) COBRA battalion formed in CRPF

- to carry out ANO (Anti-Naxalite Operations)
- 2) Greyhounds force setup in Andhra Pradesh in 1990s
 - 3) Elimination of leaders of naxalite groups
 - 4) Retaliatory attacks by security forces after any ambush
 - 5) Stopping illegal arm trade through Bangladesh and Myanmar
 - 6) Fortified police stations
 - 7) Strong intelligence network (HUMINT + COMMINT)

The two-pronged approach has shown great success in combating LWE in India. Need to carry on hard security measures with socio-economic policies like Operation Swabhiman in Odisha

Q.17

भारत की आंतरिक सुरक्षा के लिए सोशल मीडिया और नेटवर्किंग साइट्स द्वारा उत्पन्न खतरों पर चर्चा कीजिए। सूचना और प्रौद्योगिकी नियम, 2021 के तहत तथ्य-जांच इकाइयाँ (FCU) सोशल मीडिया पर फर्जी खबरों के प्रसार के समग्र खतरे को नियंत्रित करने में किस प्रकार मदद करती हैं? सरकार द्वारा तथ्य-जांच इकाइयाँ (फैक्ट चेक यूनिट) स्थापित करने के बारे में प्रेस प्रसारकों और डिजिटल मीडिया प्रतिभागियों की क्या-क्या चिंताएँ हैं? (15 अंक, 250 शब्द)

Discuss the threats posed by social media and networking sites to the internal security of India. How do the fact-check units (FCUs) under Information and Technology Rules, 2021 help in controlling the overall menace of the spread of fake news on social media? What are the concerns of press broadcasters and digital media participants about the Government establishing fact-check units? (15 marks, 250 words)

Social media and networking sites (SMNS)

are increasingly becoming an important security theatre due to the potential of disinformation campaigns, data leaks and deep fake technology.

Threats posed by SMNS

- ↳ Hybrid warfare by adversaries use SMNS to spread false narratives
- ↳ Terrorist groups are recruiting and promoting lone wolf attacks through SMNS
- ↳ Use of deep fakes during elections or on potent politically sensitive issues

has the potential to create civic discord

↳ Data breach through cyber warfare and cyber espionage by adversaries poses grave threats.

Role of Fact-check units

Indian government has proposed to certify and regulate FCUs as well as setup its own PIB-FCU under IT Rules 2021

for following reasons:

- ↳ Curb the menace of fake news
- ↳ Counter false propaganda
 - ↳ disinformation about indigenously made vaccines against COVID-19
- ↳ Ensure social and communal harmony
 - ↳ religious polarisation through fake propaganda results in mob lynching

↳ Adopt a proactive preventive approach rather than reactive curative one

Concerns of press and digital media

↳ Journalists fear censorship of their work in the name of fact-checking

↳ PIB-FCU has the potential to be misused to label any critical voice as false propaganda

↳ It can be used by party in power to build suitable narrative

Highlighting the significance of an independent and free media. Bombay

High court stayed the provisions wrt

FCUs and PIB-FCU. Govt. should

ensure that dissent isn't stifled while

making digital space secure.

- Q.18 कश्मीर घाटी में हिंसा भड़काने में हिंसक गैर-राज्य अभिकर्ताओं (वीएनएसए-Violent Non state actors) की भूमिका पर प्रकाश डालते हुए, चर्चा कीजिए कि सशस्त्र बलों द्वारा "ऑपरेशन सद्भावना" स्थानीय युवाओं की आकांक्षाओं को संबोधित करके वीएनएसए-ओजीडब्ल्यू (ओवर ग्राउंड वर्कर्स) गठजोड़ से कैसे निपट सकता है। (15 अंक, 250 शब्द)

By highlighting the role of Violent Non-State Actors (VNSAs) in inflicting violence in Kashmir valley, discuss how "OPERATION SADBHAVNA" by armed forces can tackle the VNSA-OGW (Over Ground Workers) nexus by addressing the aspirations of local youth. (15 marks, 250 words)

Violent Non-state actors are the proxy groups and front organisations setup by the adversary to sustain the vicious cycle of violence in militancy affected areas.

In Kashmir valley, these VNSAs have played a big role in fomenting instability:

- 1) Attacking security forces to start the cycle of violence
- 2) Spread propaganda and recruit youth showing them a 'better future'
- 3) Spew hatred and religious polarisation to destroy communal

harmony thereby causing riots

- 4) Using smuggled arms and weapons to ambush military vehicles
- 5) Foster civic discord and resist developmental activities, leading to further alienation of locals.
- 6) Convince locals through force or false propaganda to 'support their cause' as overground workers (OGW)
- 7) Engage in illegal financial activities (money laundering, drug trade etc) to finance violent protests

Operation Sadbhavana, launched by

Indian Army, is an effort win the 'hearts and minds' of the locals, especially the youth.

↳ Army runs skill development centres

to make the youth employable, preventing them from lure of OGWs.

2) Building schools and hospitals to

generate soft and caring image
countering false narratives

3) Providing livelihood opportunities (like electrician, transporter etc) in cantonments to build cooperation and trustworthy networks of local populace

4) Provide coaching for competitive exams to youth to help them join mainstream, saving them from polarisation.

5) Disaster relief during 2005 earthquake and 2014 floods helped build positive image.

Operation Sadbhavana is a great effort in tackling the VNSA-OGW nexus and in bringing Kashmiri youth into national mainstream

Q.19

“आपदा जोखिम न्यूनीकरण (disaster risk reduction) के लिए वैश्विक स्तर पर विभिन्न समझौतों के अभिसरण की आवश्यकता है”। उपरोक्त कथन के आलोक में, 2030 एजेंडा, पेरिस समझौता, नया शहरी एजेंडा (new urban agenda), एसडीजी आदि जैसे अन्य समझौतों के साथ अभिसरण में काम करने वाले सेंडै फ्रेमवर्क के महत्व पर विस्तार से चर्चा कीजिए। भारत ने अपनी आपदा जोखिम न्यूनीकरण रणनीतियों को वैश्विक पहलों के साथ संरेखित करने के लिए क्या पहल की हैं? (15 अंक, 250 शब्द)

“Disaster risk reduction requires convergence of various agreements at global level”. In light of the above statement, elaborate on the importance of the Sendai Framework working in convergence with other agreements like the 2030 Agenda, Paris Agreement, New Urban Agenda, SDGs, etc. What initiatives have been taken by India to align its disaster risk reduction strategies with global initiatives? (15 marks, 250 words)

Sendai Framework on Disaster

Risk Reduction (DRR) is a global

blueprint, framed in 2015, to build

cooperation and consensus in disaster

mitigation and response efforts.

Importance of SF DRR

↳ SF DRR highlights the importance of collective effort in tackling disasters

↳ It mandates countries to setup of professional relief forces

↳ Promotes research on hazard zonation and reducing vulnerabilities

Significance of convergence

- ↳ Paris Agreement calls for containing temperature rise to 1.5°C. This is also crucial for reducing risk from rising frequency of heatwaves
- ↳ 2030 Agenda and SDGs focus on socio-economic inclusive development which helps build resilience against disasters, as promoted under SFDRR
- ↳ New Urban Agenda calls for planned and sustainable cities. Flood risk reduction under SFDRR focusses on similar things.

Thus, all these agreements are interdependent and their success will depend on each other, necessitating convergence.

India has taken several steps

to align its DRR with global initiatives

1) Early warning systems:

eg) Landslides - Kalimpong

Tsunami - Bottom Pressure Recorders

2) National Disaster Response Force

is highly trained and equipped with latest technology

3) National Disaster Management Plan 2019

4) Building community preparedness through Aapda Mitra Scheme (1 lakh trained volunteers)

5) Starting dedicated projects

eg) National Cyclone Risk Management Project, National Seismological Network

6) Assistance and relief during global disasters eg) 2023 Turkey-Syria earthquake

India has taken appreciable steps but we can't let our guard down to climate change.

Q.20

विकास के केंद्र होने के अलावा, शहरी क्षेत्र आपदा जोखिमों के संचय के केंद्र भी हैं। मेगा-अर्बन शहरों में आपदा प्रबंधन विशेष रूप से जटिल क्यों है? शहरी क्षेत्रों में आपदा प्रबंधन और जोखिम न्यूनीकरण की समस्याओं को दूर करने के लिए क्या उपाय किए जा सकते हैं? (15 अंक, 250 शब्द)

In addition to being the centres of growth, urban areas are also centres of accumulating disaster risks. Why is disaster management particularly complex in mega-urban cities? What measures can be undertaken to address the problems of disaster management and risk reduction in urban areas? (15 marks, 250 words)

Urban cities in India occupy only 3% of the land but contribute \approx 60% to the GDP. This asymmetry also makes them highly vulnerable to disasters.

Reasons for complex disaster management in mega-urban cities

- 1) Many natural disasters become deadly because of urban anthropogenic factors like encroachment of lakes and rivers
- 2) Unplanned and uncontrolled growth on the outskirts makes preparedness difficult
- 3) Humungous size of population with

different levels of awareness and literacy makes management complex.

4) Presence of slums and underdeveloped areas increases social vulnerability, which can't be addressed by disaster management teams.
(DM)

5) Building density is high, making evacuation plans complicated.

Measures to address these issues

1) Planned organised urbanization with building codes necessitating disaster risk reduction

2) Building sponge cities (like China) to reduce vulnerability to flood hazards

3) Civic volunteers should be encouraged

in each locality to generate awareness

eg Aapda Mitra Scheme

4) Slum redevelopment and availability
to affordable rental housing to reduce
social vulnerability eg Dharavi Mumbai

5) Removing encroachment and reviving/
building new lakes

eg Delhi - city of lakes project

6) Peri-urban infrastructure should
be improved to help communities
on outskirts to build resilience

7) Local hospitals should be upgraded
to ensure their capacity to handle
relief work

8) Disaster being included in School
Curriculum to generate awareness

and DM

DRR in urban areas in a

Complex process which requires the
aforementioned multi-pronged strategy