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NEXT IAS

MAINS TEST SERIES 2.0 - 2025 (SLT)

(To be filled by candidate)

TEST CODE : SLT250[illegible] 6 Test No : [illegible] 06

Name of Candidate: Darshana singh Mobile No. [redacted]

Roll No. : AIM2SLTQCA10018 Start Time 03:30 End Time.....

Date of Examination: 31/07/25 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

1. 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.
2. Candidates must mention all relevant details like Name, Email, Roll No, Mobile, etc. in the space allocated.
3. Candidate is expected to attempt all 12 questions within the given timeline.
4. Answers must be written in the medium authorized at the time of admission.
5. 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.
6. Please write neatly. Avoid illegible writing.
7. Do not write/mark irrelevant matters in the QCAB.

सामान्य निर्देश

1. QCA पुस्तिका प्राप्त होने पर कृपया तुरंत जांच लें कि इस QCA पुस्तिका में कोई पृष्ठ या सामग्री आदि गलत छपी हुई या फटी हुई या गायब तो नहीं है। यदि ऐसा है, तो इसे एक नई QCA पुस्तिका से बदल लें।
2. अभ्यर्थियों को सभी प्रासंगिक विवरण जैसे नाम, ईमेल, रोल नंबर, मोबाइल नंबर आदि का आवंटित स्थान पर उल्लेख करना होगा ।
3. अभ्यर्थियों से अपेक्षा की जाती है कि वह आवंटित समय-सीमा के भीतर ही सभी 12 प्रश्नों के उत्तर-लेखन का प्रयास करें।
4. प्रत्येक उत्तर, प्रवेश के समय चुनी गयी भाषा के माध्यम में ही लिखे जाने चाहिए।
5. 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।
6. कृपया साफ-सुथरा लिखें। अपठनीय लेखन से बचें।
7. QCAB में अप्रासंगिक तथ्यों को न लिखें / न ही चिह्नित करें।

REMARKS: .....

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FOR OFFICE USE ONLY

Student Concerns / Query	Evaluator's Feedback / Response
1	1 .....
.....	.....
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.....	.....
2	2 .....
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3	3 .....
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MARKING SCHEME *

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

Topper's Copy	Common mistake and Correct Filled QCAB
Copy Scanner App	Next IAS Test Centre Location

MACRO COMMENTS

The Purpose of MTS 2.0 Score Improvement Program (SIP) is to provide constructive suggestions on 'How to improve Answer Writing and thereby score better marks.

Q1.

Introduction	Body	Conclusion

Q2.

Introduction	Body	Conclusion

Q3.

Introduction	Body	Conclusion

Q4.

Introduction	Body	Conclusion

Q5.

Introduction	Body	Conclusion

Q6.

Introduction	Body	Conclusion

Q7.

Introduction	Body	Conclusion

Q8.

Introduction	Body	Conclusion

Q9.

Introduction	Body	Conclusion

Q10.

Introduction	Body	Conclusion

Q11.

Introduction	Body	Conclusion

Q12.

Introduction	Body	Conclusion

Q13.

Introduction	Body	Conclusion

Q14.

Introduction	Body	Conclusion

Q15.

Introduction	Body	Conclusion

Q16.

Introduction	Body	Conclusion

Q17.

Introduction	Body	Conclusion

Q18.

Introduction	Body	Conclusion

Q19.

Introduction	Body	Conclusion

Q20.

Introduction	Body	Conclusion

Candidates must not write on this margin

1. रक्षा क्षेत्र और आधुनिक युद्ध में मानव रहित हवाई वाहनों (यूएवी) के महत्व पर चर्चा कीजिए।

(उत्तर 150 शब्दों में दीजिए) 10 अंक

Discuss the importance of Unmanned Aerial Vehicles (UAVs) in the defense sector and modern warfare. (Answer in 150 words) 10 Marks

The recent use of drone in the swarm attack during the Pahalgam conflict highlights the importance of UAV in defense sector & modern warfare.

Importance of UAV in the defense Sector/s.

① Patrolling in high altitude areas
e.g. Siachen glacier

② Intelligence gathering and aiding the agencies like IB & RAW
e.g. UAV surveillance in the maritime borders

③ Predicting a missile attack to strengthen defense & retaliation strategy
e.g. strengthening border infrastructure in closed side.

Importance of UAV in the Modern warfare :-

① used by countries for carpet bombing
e.g. Russia used it in Ukraine Russia conflict

Candidates must not write on this margin

(2) Use of UAV in targeted attack of critical infrastructure

e.g.] Iran's nuclear facility attack in Isfahan

(3) Use of UAV's in espionage activities.

e.g.] ~~Deep~~ Drones caught in India-pakistan border

Challenges of using UAVs

(1) Lack of Indigenous defense manufacturing in India

(2) Technology capture by countries like USA

e.g.] ~~General~~ GE holds IPR for various new designs.

(3) Threat to territorial ~~integrity~~ & sovereignty.

(4) unethical use of UAV in warfare → targeting civilian infrastructure.

Way forward → (1) Addressing the accessibility disparity between countries (Open IPR policies)

(2) Boosting indigenious capabilities through iDex, to promote startups in defense

The Current era of hybrid warfare demands for robust use of technology to enhance defense capabilities.

Candidates must not write on this margin

2. कृत्रिम तंत्रिका नेटवर्क क्या हैं? मशीन लर्निंग और कृत्रिम बुद्धिमत्ता में उनके महत्व पर चर्चा कीजिए।

(उत्तर 150 शब्दों में दीजिए) 10 अंक

What are artificial neural networks? Discuss their importance in machine learning and artificial intelligence.

(Answer in 150 words) 10 Marks

Artificial Neural Networks (ANN) mimick the brain neutral network for developing artificial intelligence related to learning, decision making and creating new information.

Importance of ANN in Machine learning:-



(1) ANN can be used as a tool to develop machine learning models

(2) Machine learning refers to feeding the data sets to ~~machine~~ an algorithm, using which AI can analyse the data, read the data and make predictions.

(3) Large Language Models - use ANN for machine learning development e.g. Gemini of Google

Importance of ANN in Artificial intelligence

(1) ANN is a subset to develop artificial intelligence

Candidates must not write on this margin

② ANN can be used to develop other models that can create images, videos, audio etc.

e.g] Sora model

Challenges of using ANN :-

① AI Hallucinations – creating new information on its own which is wrong as well

② Blackbox decision making – Lack of transparency on how AI arrives at a decision

③ AI Bias - social bias can also reflect on the modeling using ANN

e.g] Bias in selecting employee based on certain ~~sale-specific & Gender specific~~ keywords

④ Energy consumption - one Chatgpt search consumes 10 times more data than Google

Way forward - ① Develop own dataset (AI Kosh) and compute facility (10,000 GPUs)

↳ ② Bhaashini program for indigenous LLM (e.g] Bhashini, Sarvam, Chitralekha)

NITI Ayog's strategy (Responsible AI for all) should be adopted while developing AI technology

Candidates must not write on this margin

3. परिशुद्ध औषधि की अवधारणा का परिचय दीजिए। दुर्लभ एवं विशिष्ट रोगों के उपचार में परिशुद्ध औषधि की भूमिका पर टिप्पणी कीजिए। (उत्तर 150 शब्दों में दीजिए) 10 अंक

Introduce the concept of precision medicine. Comment on the role of precision medicine in the treatment of rare and specific diseases. (Answer in 150 words) 10 Marks

~~Recently the health ministry banned more than~~ Recently, the Indian government completed the ~~Human~~ Indian Genome project (complete data of 10,000 individuals) aiding to precision medicine

Precision Medicine - It is the development of medicines that cater to the specific disease while considering the unique risk factors of the individual.

Role of precision medicine in treatment of ~~rare & specific diseases~~:-

(1) Fixed dose combination drugs (FDC) made to address the specific condition of the patient

(2) use of Genomic data to identify risk factors
e.g. presence of geno- BARC1 & BARC2 shows high risk of cancer among India.

(3) used to predict the diseases in a certain population
e.g. Indian population - 74% risk of cardiovascular diseases.

Candidates must not write on this margin

④ Genetic modification to treat genetic diseases.

e.g. use of CRISPR-CAS 9

⑤ use of precision medicine for long term healing of rare diseases.

e.g. Muscular atrophy medicine.

⑥ Treatment of Cancer using Precision Medicine

e.g. CAR-T Cell therapy.

Challenges of Precision medicine

→ ① High cost; lack of accessibility

→ ② Lack of research on rarest of rare conditions

→ ③ FDC drugs can caused sideeffects if not administered properly

e.g. Banning of more than 150 drugs

Way Forward

→ ① fixed guidelines to develop the Precision Medicine

→ ② financial assistance

→ ③ Bioethics principles should be followed

If used properly Precision medicine has the potential to reduce the disease burden in India

Candidates must not write on this margin

4. एक्सिऑम-4 मिशन क्या है? एक्सिऑम-4 मिशन में भारत की भागीदारी भारत के मानव अंतरिक्ष कार्यक्रम को कैसे सशक्त करेगी ? (उत्तर 150 शब्दों में दीजिए) 10 अंक

What is the Axiom-4 mission? How will India's participation in the Axiom-4 mission help in bolstering India's human space programme? (Answer in 150 words) 10 Marks

Recent Success of Subhanshu Shukla's mission to the International space station is part of the Axiom-4 Mission.

Axiom-4 mission - Sending Astronauts to the International space station for ~~developing and monitoring~~ training them for prolonged human space missions.

Axiom-4 mission help in bolstering India's human space program :-

① facilitating the India's vision for Bharatiya Antriz Station

② Microgravity experiments to study its impacts on physical aspects of astronauts

③ Helps in learning about space missions and their sustainability

④ Experience for other astronauts.

Candidates must not write on this margin

(5) POEM module experimentation help to grow own food in space for longer mission

(6) Experiments conducted by Indian Astronaut Shubhanshu help in designing of our own human rated Spacecraft - Gaganyaan mission

Other benefits of Axiom-4 Mission → (1) Soft power of India

→ (2) Part of International efforts for sustainable space flights.

The axiom-4 mission will help India's human space program by providing it with relevant data, experience and important learnings.

Candidates must not write on this margin

5. चर्चा करें कि क्रिप्टोकरेंसी और अन्य उभरती प्रौद्योगिकियां मनी लॉन्ड्रिंग और आतंकवाद के वित्तपोषण के खतरे में कैसे योगदान करती हैं। इस समस्या से निपटने के लिए भारत सरकार द्वारा क्या कदम उठाए गए हैं?

(उत्तर 150 शब्दों में दीजिए) 10 अंक

Discuss how cryptocurrency and other emerging technologies contribute to the menace of money laundering and terror financing. What steps have been undertaken by the Government of India to tackle this issue? (Answer in 150 words) 10 Marks

FATF report shows that 2-5% of world's GDP is lost in money laundering and terror financing (around $800bn - 2tn $)

Emerging technology : money laundering :-

(1) Easy Placement of money in the system
e.g.] use of unregulated Cryptocurrency like bitcoins to invest black money

(2) facilitates layering of money : convoluted digital pathways.
e.g.] use of Non-fungible token to create money trails

(3) Integration of money in supply : interpersonal digital applications for small amount of money transfer
e.g.] Venmo & paypal

Emerging technology : terror financing :-

(1) Terrorist organisations are non-encrypted

Candidates must not write on this margin

currencies to find their operations
e.g. Ethereum used by Boko-haram.

(2) Global connectivity for fund transfer also helps in terror financing
e.g. ISIS recives money from several channels

(3) Lack of traceability of funds transferred through emerging technology
e.g. JeM supporting rebel groups in JK through digital modes of payments.

Steps undertaken by government :-

(1) PMLA rules ~~&~~ amendment - use of strict kyc norms, inclusion of politically exposed persons

(2) International collaboration through FATF (e.g. mutual evaluation report : Regular followup)

(3) Intelligence gathering through robust institutions e.g. FIU-IND

(4) Institutional Mechanisms - ED to curb money laundering

(5) mutual legal assistance treaty.

Further steps needs to be taken to ensure money laundering & terror financing doesnot hurt Indian economy

Candidates must not write on this margin

6. हाइब्रिड युद्ध क्या है? यह पारंपरिक युद्ध से किस प्रकार भिन्न है? भारत हाइब्रिड युद्ध की चुनौतियों का सामना किस प्रकार कर सकता है? (उत्तर 150 शब्दों में दीजिए) 10 अंक

What is hybrid warfare? How is it different from conventional warfare? How can India navigate the challenge of hybrid warfare? (Answer in 150 words) 10 Marks

Hybrid warfare is the use of various forms of warfare including non-traditional warfare.

Difference from Conventional warfare

① It may include non-combat confrontation
e.g.] Cyber attack

② Hybrid warfare includes weaponization of data and social media platforms
e.g.] propaganda spread by deep state of pakistan.

③ use of chemical, biological weapons other than arms & ammunitions.
e.g.] use of agent orange by America in vietnam

④ use of espionage, interference with internal politics to spread & fuel insurgency.

India - Navigating the challenges of hybrid warfare :-

Candidates must not write on this margin

(1) Protecting the ~~cyber security~~ Critical Cyber infrastructure

e.g.) CERT-IN.

(2) Intelligence gathering and Interagency coordination to prevent such attacks

e.g.) NATGRID

(3) Tri services command for integration & coordination of military services.

(4) International Collaboration.

e.g.) Interpol

(5) Modernisation of border infrastructure

e.g.) BOID QIT

(6) Bridging the developmental deficit to avoid radicalisation of youth

e.g.) Vibrant village program, winning hearts & mind

The emergence of hybrid warfare has renewed the need for a National Security doctrine

Candidates must not write on this margin

7. भारत की लंबी समुद्री सीमा किस प्रकार आंतरिक सुरक्षा के लिए गंभीर चुनौतियाँ प्रस्तुत करती है? इन चुनौतियों से निपटने हेतु सुझाव प्रस्तुत कीजिए। (उत्तर 150 शब्दों में दीजिए) 10 अंक

How does the long maritime border of India present immense internal security challenges? Suggest measures to address these challenges. (Answer in 150 words) 10 Marks

Recently the Home Ministry announced the longer maritime border of 11,098 km which calls for enhanced internal security measures.

Immense Internal security challenges - long maritime borders :-

(1) Terrorist infiltration e.g] 2011 Mumbai terror attacks.

(2) Transnational crimes e.g] Drugs smuggling from eastern coast to East Indies

(3) Piracy, threat to economic shipping
e.g) Red Sea crisis & Houthi rebels.

(4) Constant conflict with Srilankan fisherman causing unrest in Southern States

(5) Drugs and arms trafficking.

Measures to address these challenges -

(1) Patrolling of the borders [Madhukar Gupta Committee]

Candidates must not write on this margin

(2) Coordination between Indian Coast Guard, state polices and Naval Command for better surveillance

(3) Identification of ships crossing the Indian border

e.g.] Special identification number for boats.

(4) International collaboration

e.g.] Interpol & FATF

(5) Maritime Domain awareness -

Through IRNSS and all regional Surveillance System

(6) Modernisation of equipments

↳ Submarines - Vagsheer

↳ INS Vikrant

↳ MQ-9B drones for patrolling

India's maritime ~~not~~ security is necessary to ensure internal security as well as SAGAR - Security & growth for all in the region

Candidates must not write on this margin

8. जम्मू और कश्मीर में आतंकवादी गतिविधियों में कमी के बावजूद, ओवर ग्राउंड वर्कर्स (OGW) और छद्म (परोक्षी) आतंकवादी समूह भारत की आंतरिक सुरक्षा के लिए गंभीर खतरा बने हुए हैं। इन खतरों को निष्क्रिय करने के लिए क्या रणनीतियाँ अपनाई जा सकती हैं? (उत्तर 150 शब्दों में दीजिए) 10 अंक

Despite decline in terrorist activities in Jammu and Kashmir, Over Ground Workers (OGWs) and proxy militant groups continue to pose a serious threat to India's internal security. What strategies can be adopted to neutralize these threats?

(Answer in 150 words) 10 Marks

Since the abrogation of Article 370, the democratisation and decentralisation of power has led to significant decline in terrorism activities in J&K

Threat to India's internal security :-

(1) proxy militant groups - cause radicalisation of youth
   - conduct recruitment for their group
   - intermittent terror attack in the valley.

(2) Over ground workers
   - Financial & material support to militia
   - Ideological support by preparing ideological foundation in urban areas also.

(3) cases of drug trafficking from the Golden Crescent → Afghanistan.

Candidates must not write on this margin

④ Arms trafficking from the N-W region causing violence

⑤ Counterfeit currency notes leading to terror financing

⑥ use of technology like encrypted calls to avoid traceability.

Measures to neutralise these threats -

① Zero tolerance policy to terrorism & violence

② Stopping the terror funding through intelligence gathering on these Hawala network

③ Improving Developmental parameters - Health, Education & living standards.

e.g. Skilling of youth through USTTAD

④ Military public relations - winning hearts & minds

⑤ Elections free & fair & democratic power transfer.

The role of external state & non state actors to destabilise the terrorists alley should be met through force for terrorists and development to local population

Candidates must not write on this margin

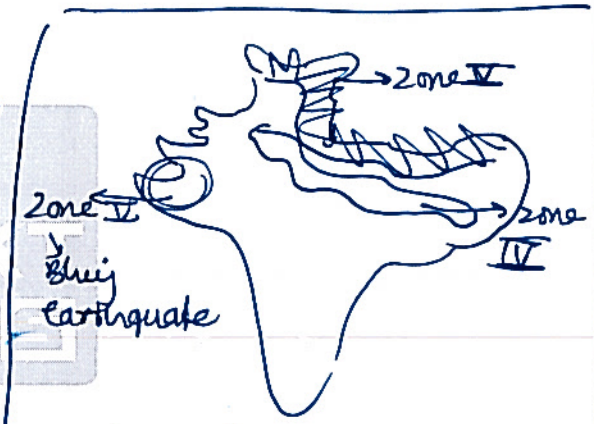
9. भूकंप संबंधी आपदाओं के प्रति उत्तरी भारत की संवेदनशीलता पर चर्चा कीजिए। उनके प्रभावों को कम करने में भारत की तैयारियों पर प्रकाश डालें। (उत्तर 150 शब्दों में दीजिए) 10 अंक

Discuss the vulnerability of northern India to earthquake-related disasters. Highlight India's preparedness in mitigating their impacts. (Answer in 150 words) 10 Marks

Vulnerability refers to inverse relationship with the coping ability to a disaster. Joshimath Sinking & earthquake tremors highlight the vulnerability of northern India to EQ related disaster

Vulnerability of Northern India to EQ-related disaster :-

(1) Himalayas - young - fold mountains, steep slopes and sedimentary rocks → increasing vulnerability



Vulnerability of Northern India to EQ.

(2) Northern part collides with the Asian Plate making it more vulnerable

Anthropogenic Causes
- (1) Tunneling (Joshimath sinking)
- (2) Infrastructure construction (Tehri dam)

Candidates must not write on this margin

→ (3) Mining

→ (4) Ignoring the ~~blob~~ ecological carrying capacity

→ (5) Enhanced risk of connected disasters in northern parts

Landslides, Flashfloods, GLOFs

India's preparedness in Mitigation the impacts – NDMA guidelines

(1) understanding the risk – Hazard zoning & Mapping

↘ by Geological Survey of India

(2) Structural measures – Better houses (wooden), Retaining walls, use of geotextiles.

(3) Non-Structural measures – Early warning System in place ; information dissemination System.

(4) Capacity building of people, agencies to deal with earthquake

Hazard is natural but a disaster is man made, It can be prevented through guidelines & preventive measures.

Candidates must not write on this margin

10. "आपदा जोखिम न्यूनीकरण की दिशा में तैयारी (तत्परता) पहला कदम है।" इस संदर्भ में, भारत में आपदा तैयारी और पूर्व चेतावनी प्रणालियों को सुदृढ़ बनाने में भारतीय मौसम विज्ञान विभाग (IMD) की भूमिका का आकलन कीजिए।
(उत्तर 150 शब्दों में दीजिए) 10 अंक

"Preparedness is the first step towards disaster risk reduction". In this context assess the role of the Indian Meteorological Department (IMD) in strengthening disaster preparedness and early warning systems in India. (Answer in 150 words) 10 Marks

Sendai principles argue that Preparedness for a disaster can help in risk reduction and minimising the damage

1 $ invested in preparedness saves 4$ in damage control

Role of IMD in Strengthening disaster Preparedness & early warning systems.

(1) Project Mausam launched to assess the variability of monsoon
↳ to prepare for draught or flash flood like situation

(2) Early warning System for heatwaves release by IMD under heatwave action plan.

(3) Advisory for thunderstorm & rain
e.g. to prevent damage in urban floods

Candidates must not write on this margin

life situation.

(4) Early warning on System for Cyclones on coastal areas.

↳ to facilitate early evacuation and prevent damage of life.

↳ Graded advisory to give ample time for disaster preparedness

Limitations → (1) Lack of panchayat level data collection.

→ (2) Lack of infrastructure

↳ Strong satellite network to be developed countries

(3) climate change variability causing erratic weather patterns

(4) Lack of enough supercomputers to improve predictability.

As the IMD completes 100 years it is prudent to appreciate the role of IMD on disaster preparedness & prepare its for better · handling & prediction of disasters

Candidates must not write on this margin

11. हाल ही में शुरू की गई BioE3 नीति के लक्ष्यों और उद्देश्यों की व्याख्या कीजिए। यह नीति अर्थव्यवस्था के "हरित विकास" को सुनिश्चित करने में किस प्रकार सहायक हो सकती है? (उत्तर 250 शब्दों में दीजिए) 15 अंक

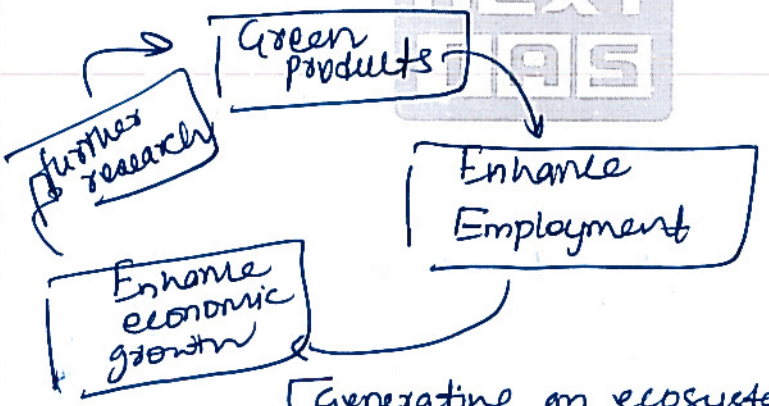
Explain the aims and objectives of the recently launched BioE3 policy. How can the policy help in ensuring "green growth" of the economy? (Answer in 250 words) 15 Marks

BioE3 policy consists of Ecology, Economy and Employment development in the biotech sector to ensure green growth of the economy.

Aim & Objective of BioE3 policy -

(1) Developing infrastructure like labs, best equipments to promote research in biotech

(2) collaboration :- Industry academic linkage



[Generating an ecosystem of green growth in Indian economy]

(3) promoting Startups in Biotech sector

e.g. Startup Innovation & Incubation Centre at IITK (SIIC)

(4) use of the bio-products in public sectors

e.g. Development of bio-gas engines

Candidates must not write on this margin

Bio E3 ensuring green growth of economy.

(1) By generating employment in the sector

e.g. employing PhD students from biotech fields.

(2) By enhancing the Biofuel policy of India

e.g. 20% petrol mixing with ethanol by 2025

(3) Promoting diverse incomes of the farmers

e.g. research can be used to implement Gobardhan scheme

(4) Promoting international alliance by making India as hub for biotechnology

e.g. Global biofuel alliance at G20.

(5) Addition to Non-forest fuel energy, Panchamrit goals

(6) Enhancing tax revenue for the government from dormant sectors like biowaste

Candidates must not write on this margin

Challenges to the BIOE3 policy :-

1. Lack of R&D infrastructure
   - e.g. only 0.64% of GDP on research
2. Skilling of professionals to conduct the research.
3. Bureaucratic hurdles in the implementation of scheme
4. Institutional and funding support to already existing institutions like ICAR

Way forward -

1. promote innovation through AIM (Atal innovation mission)
2. use of indigenous knowledge and technology.
3. Skilling of professionals to generate enough employment

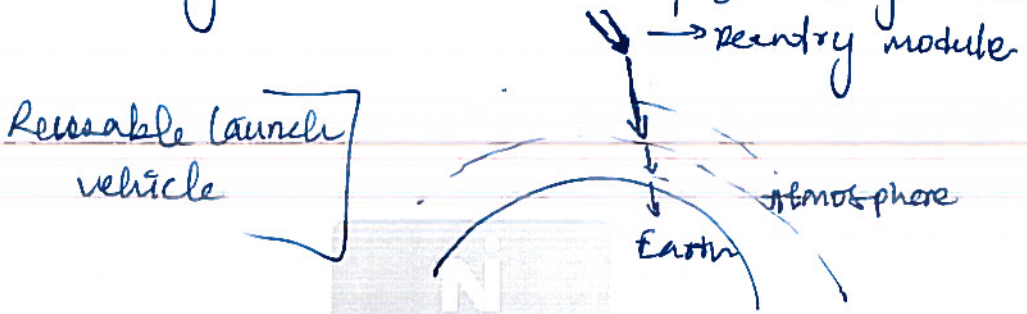
BIOE3 policy can catapult the Indian economy to realise the vision of developed India by 2047

Candidates must not write on this margin

12. भविष्य के अंतरिक्ष संचालन और मिशनों में पुन: प्रयोज्य प्रक्षेपण वाहनों की क्षमता पर चर्चा कीजिए। पुन: प्रयोज्य प्रक्षेपण वाहनों के विकास की दिशा में भारत की क्या पहल है? (उत्तर 250 शब्दों में दीजिए) 15 अंक

Discuss the potential of reusable launch vehicles in future space operations and missions. What are India's initiatives towards the development of reusable launch vehicles? (Answer in 250 words) 15 Marks

Reusable launch vehicle are the cornerstone of future space operations & mission by enabling human space flight programmes.



↳ ensure the right angle and speed to prevent a blast while re-entering into the atmosphere

Potential of reusable launch vehicle in future space operation & mission :-

① Sample return missions → Chandrayaan-4 will return to earth with lunar regolith samples.

② Allows human spaceflight mission → Gaganyaan

Candidates must not write on this margin

(3) Developing future Space Station → Bharatiya Antariksh station

(4) Promoting Economy of scale on Reusable launch vehicle → Space tourism

(5) Entry of private sector in launch vehicle e.g. SpaceX modules brought back Sunita williams from space.

(6) Dealing with space debris (Kessler Syndrome)

(7) Sustainability of space missions using the same vehicle again.

India's initiative towards development of reusable launch vehicles :-

(1) Reusable Reentry experiment (REX) & LEX - experiments Conducted by ISRO

(2) use of Chinook helicopter to test the landing abilities of sounding rockets.

(3) New Launch vehicle mark-3

Candidates must not write on this margin

④ Next generation ~~launch~~ Launch vehicle (NGLV) → Soorya, tested for human safety is being developed.

⑤ Test - Pad Abort test + Crew escape test

Challenges :-

① ~~Limited budget of ISRO~~

② complex physics to follow while the module re-enters to the earth's atmosphere

③ Human lives at stake - hence extra security measures required.

④ requirement of compatible material for the rocket and reusable modules.

Despite these challenges, ISRO is working towards achieving the success of reusable launch vehicle to realise the dream of Bharatiya antriksh station

Candidates must not write on this margin

13. 'मेजोराना 1 और विलो जैसे उन्नत चिप के विकास के साथ, क्वांटम कंप्यूटर अब केवल एक सिद्धांत नहीं, बल्कि वास्तविकता बन चुके हैं।' क्वांटम कंप्यूटिंग के सिद्धांत क्या हैं? भारत में क्वांटम प्रौद्योगिकियों के विस्तार (वर्धन) में राष्ट्रीय क्वांटम मिशन कैसे सहायक है? (उत्तर 250 शब्दों में दीजिए) 15 अंक

'With the development of advanced chips like Majorana 1 and Willow, quantum computers are no longer a theory but a reality'. What are the principles of quantum computing? How does the National Quantum Mission help in scaling up quantum technologies in India?
(Answer in 250 words) 15 Marks

The industrial revolution 4.0 is developed one step further through the developments of advanced chips like Majorana 1 (Microsoft) and willow (Amazon)

Principles of Quantum computing

① **Superimposition** - other than binary like 0, 1 quantum bits can exist in multiple states. at the same time
i.e.) much faster computation

② **Entanglement** - Qbits also show the quality of entanglement through which they can communicate from far away
↳ application → Quantum communication encryption ; satellite Communication

③ **Coherence** - Qbits can maintain their state for longer duration
↳ application - allows quantum computing to be stable.

Candidates must not write on this margin

National quantum mission on scaling up quantum technologies in India :-

1. Build a central knowledge network to enable ~~Indust~~ collaboration among academics.
2. use of Supercomputers at centres of excellence
   e.g.: AIRAWAT at IISC Bangalore
3. promoting use of quantum technology for public welfare and real life applications
   e.g.: Param SuperComputers are used for weather forecasting.
4. Align with Semiconductor mission to develop ~~ing~~ Indegenious capability of Semicon chips.
5. Developing indegenious quantum chips & satellite.

Candidates must not write on this margin

Challenges

1. Slower moving of the research projects.
2. Researchers working in silos ~~with~~ unlike collaborations in Ivy leagues.
3. less than required funding for the mission.
4. ~~Physical~~ Physics research students move out for better opportunities.
5. Lack of Private investment, reducing transformation of research to industrial applications.

Way forward

1. Enable collaboration of universities with Indian institutes of excellence
2. Increase in funding
3. Securing the supply value chains of critical minerals (e.g. leveraging Mineral security Partnership)

Given the talent in India, we can develop ~~this~~ & become the central hub for quantum technology.

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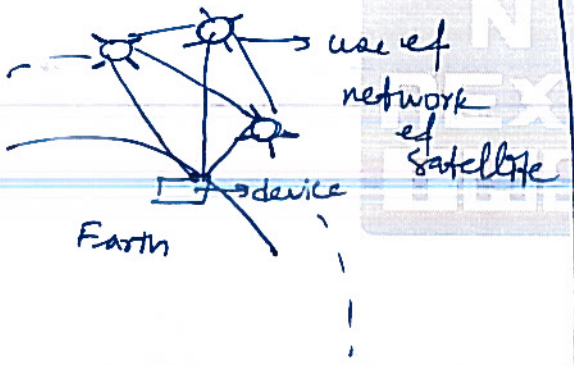
14. कार्य सिद्धांत, पहुँच, विस्तार क्षमता और सीमाओं के संदर्भ में फाइबर ऑप्टिक संचार के साथ उपग्रह संचार की तुलना कीजिए एवं अंतर बताइए। (उत्तर 250 शब्दों में दीजिए) 15 अंक

Compare and contrast satellite communication with fiber optic communication in terms of working principles, accessibility, scalability, and limitations.

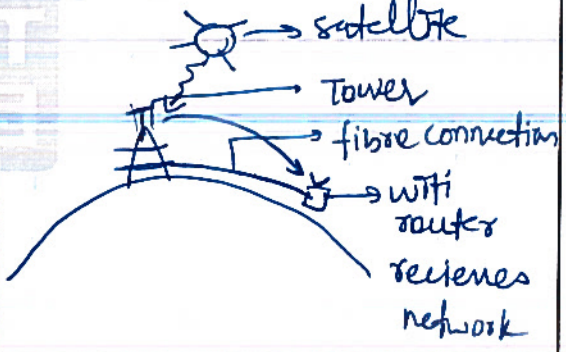
(Answer in 250 words) 15 Marks

Satellite communication directly transfers the signals from satellites to devices without using towers; while fibre optics use of network of cables and Towers

Satellites



Fiber optics communication



Principles → works on the principle of Satellite-Transponder, and recieving device on earth.

↳ Triangulation of Satellite for data authentication.

→ The network of towers are connected through the fast fibre optic cables →

These cables transmit the messages to the routes.

Candidates must not write on this margin

Accessibility -

Developed by private companies like Spacex, Amazon

↳ Access is limited to certain PIPT projects and areas including developed countries

Highly accessible due to long development of cables

↳ sea lines of communications, optic networks.

↳ lack of access in rural areas where no towers are available

Scalability -

↳ Launching of several satellites can covers the entire earth and increase the scale

↳ High initial cost

↳ Scale can be enhanced through traditional methods of laying down optical fibre connections

Benefits -

(1) can be used provide access to unreachable areas

(2) Hilly and dangerous terrain where fibre

Benefits -

(1) access the traditional methods.

(2) known harms & disadvantages.

Candidates must not write on this margin

optic cables cannot be layed down.

(3) Cheap infrastructure If economy of scale in Satellite manufacturing & launching is achieved

(3) Repair and maintenance work can be controlled from land.

Limitations -

(1) creates space traffic with large number of Satellites.

(2) space debries. If not working satellites are not brought back

(3) use of satellite internet by terrorists and non state actors → e.g. using to manipulate conflict during internet shutdown

Limitation -

(1) SLOC vulnerable to conflicts e.g. Red Sea crisis due to houthi rebels

(2) prone to disasters like Earthquake, floods Tsunamis etc.

(3) Large infrastructure requirement to reach to rural areas.

(4) Radio waves cause ecological disturbance

Precautionary principle should be adopted with relevant regulation to ensure equitable and ethical use of new communication technology

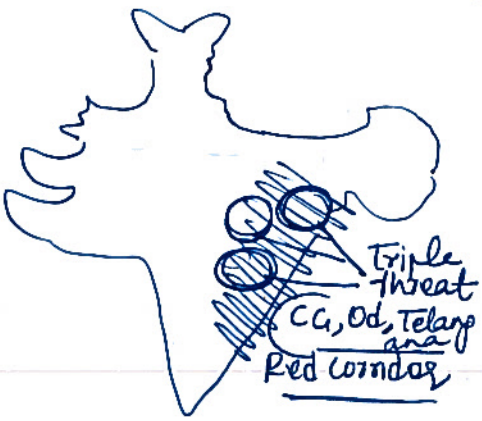
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15. वामपंथी उग्रवाद (एलडब्ल्यूई) भारत की आंतरिक सुरक्षा के लिए चुनौती बना हुआ है। देश में वामपंथी उग्रवाद के मुद्दे को हल करने के लिए भारत सरकार के दृष्टिकोण पर चर्चा कीजिए। (उत्तर 250 शब्दों में दीजिए) 15 अंक

Left-wing extremism (LWE) continues to remain a challenge to India's internal security. Discuss the Government of India's approach towards solving the issue of LWE in the country. (Answer in 250 words) 15 Marks

Naksal Mukt abhiyaan by 2026 announced by homeministry shows the dedication & Commitment of GOI to eradicate LWE in the country.

Challenges of LWE for India's internal security:-



(1) Hindrance to developmental Programmes

(2) Radicalisation of youth e.g. Chhattisgarh - Bastar region Conducts employment drives in Abujhmarh region

(3) Propaganda against the government

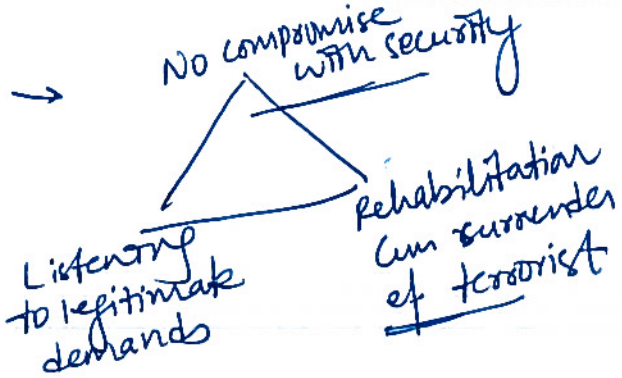
(4) loss of human lives.
e.g. Jheeram ghati attack in Chhattisgarh.

(5) vicious cycle of violence and continued governance deficit.

Approach of GOI towards solving the issue of LWE:-

Candidates must not write on this margin

① Three pronged Strategy →



② operation black forest to eliminate top leaders of the movement
e.g. Basavaraju was killed

③ Security related expenditure -
e.g. fortification of police stations.

④ Modernisation of armed forces.

⑤ Capacity building through training, intelligence gathering
e.g. special forces like Bastariya Batallion, District reserve guards.

Developmental approach :-

① Panchayat extension to schedule areas act
e.g. Autonomy in local governance through Tribal advisory councils.

Candidates must not write on this margin

(2) focus on education, health, living standards to bridge the governance gaps

Schemes → Eklavya model residential school
→ Elimination of sickle cell anemia
→ Vandhan Kendra

(3) State wise special assistance to eliminate LWE

e.g.] Chhattisgarh announced 1 Cr instant transfer to panchayat for being Naxal free

(4) connecting to the mainstream economy

e.g.] Dhanti aaba jan utkarsh Abiyan

(5) Targeted approach towards vulnerable population among tribes

e.g.] PM Janman

Way forward :-

(1) Addressing the governance deficit through people centric and empathetic governance approach

(2) Focus on rehabilitation of terrorism

(3) stop the funding mechanisms.

The National action plan on Terrorism envisions an extremism free India

Candidates must not write on this margin

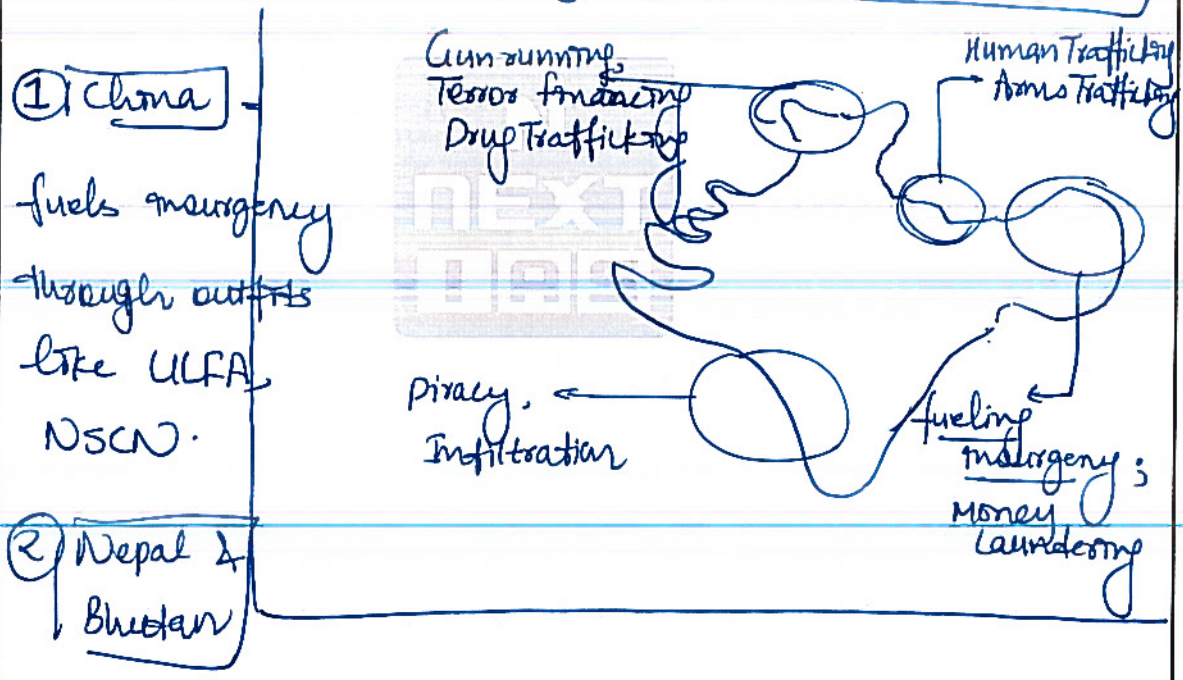
16. बाह्य सरकारी एवं गैर-सरकारी तत्वों द्वारा भारत की आंतरिक सुरक्षा के लिए उत्पन्न खतरे क्या हैं? इन खतरों से निपटने के लिए आवश्यक रणनीतियों पर चर्चा कीजिए। (उत्तर 250 शब्दों में दीजिए) 15 अंक

What are the threats posed to India's internal security by external State and non-state actors? Discuss the strategies necessary to tackle these threats.

(Answer in 250 words) 15 Marks

The recent Pahalgam attack highlights the role of external actors - State, in terms of Pakistan and non-state in terms of their motivated infiltrated terrorists in J&K.

India's internal security Threat : External state actors



↳ Porus borders, lack of Patrolling measures

↳ Causes arms trafficking, human trafficking and organised crime networks

3 Pakistan ~~J&K~~ - Zia-ul-Haq doctrine of Pakistan

↳ terrorist infiltration and causing violence.

Candidates must not write on this margin

(4) Maritime borders - Issues with pakistan on Sir Creek's border management
↳ Conflict with srilanka on kacchathevu island has spillover effects on southern states of Tamil Nadu

(5) Afghanistan - spillover terrorism.

India's ~~external security~~ threat : External non-state actors :-

(1) Cyber security - Terrorist attack on critical infrastructure
e.g.: AIIMS ransomware attack.

(2) Radicalisation & propaganda - JEM & LET instigating youth in pakistan.

(3) Organised crimes - Involvement of non-state actors in smuggling and human trafficking for forced prostitution.
e.g.: Trafficking of N-E girls to China for marriages

(4) Terror financing and money laundering - Channels to fund terror activities
e.g.: Counterfeit currency notes.

Candidates must not write on this margin

Strategies necessary to tackle the threats :-

1. Intelligence gathering to prevent such attacks.
   e.g. Crime & criminal tracking network System ; NATGRID for inter agency Coordination.
2. Capacity building and modernisation of armed forces.
3. Border patrolling e.g. Comprehensive border Management System.
4. Integrating technology in border management
   e.g. BOLD QIT
5. Protection of critical cyber security infrastructure
   e.g. CERT-IN
6. Rules & Regulation e.g. Fugitive economic Offenders acts
7. Public awareness to counter propaganda
   e.g. Cyber Jagrukta diwas.

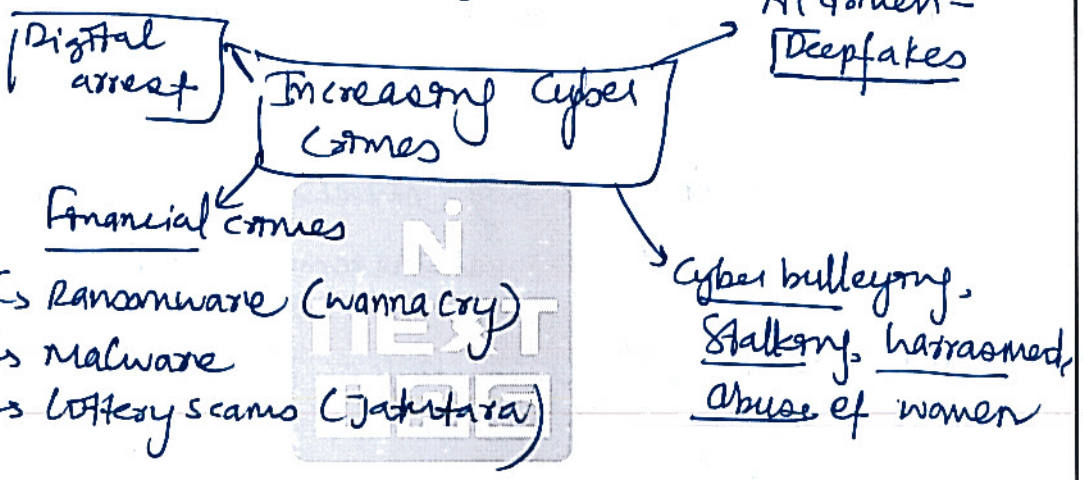
Whole of government approach is required to ensure internal security of India

Candidates must not write on this margin

17. भारतीय समाज के तेजी से डिजिटलीकरण के साथ, डिजिटल गिरफ्तारी जैसे साइबर अपराध में भी वृद्धि हुई है। साइबर सुरक्षा के प्रमुख तत्त्वों पर प्रकाश डालते हुए, भारत की साइबर सुरक्षा अवसंरचना को सुदृढ़ करने के लिए आवश्यक उपायों पर चर्चा कीजिए। (उत्तर 250 शब्दों में दीजिए) 15 अंक

With the rapid digitalization of Indian society, cyber crimes like digital arrest have also increased. Highlighting the major elements of cybersecurity, Discuss the measures needed to strengthen India's cybersecurity infrastructure. (Answer in 250 words) 15 Marks

India has almost 700 million active internet users, which also increases the vulnerability of population to cyber crimes



Major elements of cybersecurity :-

(1) Security of data - handling, collection, storage of data
↳ AP shah committee recommending indigenous storage of data e.g. Adhaar data leak

(2) Security of Network - To eliminate intrusion, disruption of the public network.
e.g. Firewall attacks.

Candidates must not write on this margin

③ Security of Application - seamless flow of application ensuring their Safety.

④ Identity access & Management → use of authentication mechanisms to access personal data

e.g. 3 factor authentication in UPI

③ Measures needed to strengthen India's Cybersecurity infrastructure :-

① legislative measures :-

IT rules.

Digital personal data protection Act

Right to privacy

② Regulatory measures :-

Digital media ethics code

③ Individual awareness -

use of different & strong passwords;

Cross checking information

use of firewalls protections, Anti virus

Candidates must not write on this margin

Provisions for bot cleaning centres
cyber jagrukta divas

(4) Institutional measures

Indian Cyber crime coordination Centre

Emergency response through CERT-IN

(5) simplication of reporting - to ensure Cyber Crimes are reported (only 2% crimes are reported)

e.g.) Sanchar saathi portal.

Way forward :-

① Focus on intelligence gathering to to prevent attack on Critical infrastructure

② Capacity building of cyber professionals and officers → training

③ Inter-agency coordination

India's Cybersecurity infrastructure needs to be strengthened to ensure the trust of public in using digital infrastructure

Candidates must not write on this margin

18. अवैध आव्रजन भारत के लोकतंत्र, संप्रभुता और आंतरिक सुरक्षा के लिए खतरा उत्पन्न करता है। इस कथन के आलोक में, चर्चा कीजिए कि हाल ही में पारित आव्रजन और विदेशी अधिनियम, 2025 अवैध आव्रजन के मुद्दे से प्रभावी ढंग से निपटने में कैसे सहायता करता है। इस अधिनियम से संबंधित संवैधानिक और संभावित मानवाधिकार संबंधी चुनौतियाँ क्या हैं?

(उत्तर 250 शब्दों में दीजिए) 15 अंक

Illegal immigration poses a threat to India's democracy, sovereignty and internal security. In light of this statement, discuss how the recently passed Immigration and Foreigners Act, 2025 helps in effectively addressing the issue of illegal immigration. What are the constitutional and potential human rights challenges associated with the Act?

(Answer in 250 words) 15 Marks

The conflict in the North-East region due to illegal immigration has led to a threat to India's democracy, Sovereignty & internal security.

Illegal immigration → Threat

① Democracy
↳ destabilisation of society.
↳ Disturbing the power balance

② Sovereignty
↳ It may fuel insurgency type situation

③ Internal Security –
Case of violence, associated illegal activities like organised crimes & ethno cultural terrorism

Candidates must not write on this margin



Candidates must not write on this margin

Candidates must not write on this margin

19. जलवायु परिवर्तन और तेजी से हो रहे शहरीकरण ने भारत में गर्मी की लहरों के प्रभाव और आवृत्ति को तीव्र कर दिया है। चर्चा कीजिए। हीट एक्शन प्लान (एचएपी) भारत में हीटवेव प्रबंधन को कैसे बेहतर बना सकते हैं?

(उत्तर 250 शब्दों में दीजिए) 15 अंक

Climate change and rapid urbanization have intensified the impact and frequency of heat waves in India. Discuss How can Heat Action Plans (HAPs) improve heatwave management in India?

(Answer in 250 words) 15 Marks

India's vulnerability Atlas shows that heat waves impact more than 40% of Indian population which is intensified by climate change & lapid urbanisation.

Climate change : Impact on heat waves

Heat waves
2:40°C & 74.5-6°C above than normal is heat waves
76°C above normal is severe heat wave

(1) Increase in the intensity - higher number of severe heatwaves.

e.g. 2024 as the hottest year on record

(2) Higher temperature → due to global warming

(3) Delay in monsoon to relief from the continuous impact of heatwave.

Rapid urbanisation : Impact on heat waves

(1) Formation of urban heat domes.

(2) Lack of ventilation increases the impact of heat wave.



Candidates must not write on this margin

(3) Lack of greenery - higher average temperature

(4) concretisation - absorbs more heat to increase the intensity

(5) Lack of natural shade to protect from heat waves.

Heat Action Plan - Improve heatwave management

(1) Notifying & announcing the advisory - Early warning system to stop people from going out unnecessary

(2) General guidelines to deal with the impact of heatwaves
- Regular hydration, with ORS
- use of cotton clothes
- Avoid darker clothes.

(3) Structural measures to reduce the impact of heatwaves
- building infrastructure for informal workers to rest & stay.

Candidates must not write on this margin

- Advocating for traditional cooling systems at home to reduce energy demands

(4) Non-structural measures to reduce the impact of heatwaves

- Availability of public hospitals with relevant resources and staff
- Training of the staff.

(5) Interagency coordination

- Coordination with health agencies, local government, educational institutions to administer the heat action plan

(6) Climate risk management → Adaptation measures
  ↳ Sustainable housing conditions
  → Mitigation measures
  ↳ Switching to non fossil fuel based sources

The long term action plan to protect the vulnerable population lies on adopting the approach of lifestyle for environment (LiFE)

Candidates must not write on this margin

20. अनुचित भीड़ नियंत्रण तंत्र के कारण होने वाली भगदड़, जो कि रोकी जा सकती है, भारत में लगातार लोगों की जान ले रही है। ऐसी आपदाओं के अंतर्निहित कारणों पर चर्चा कीजिए। कुशल भीड़ प्रबंधन के लिए कौन-से संस्थागत और प्रौद्योगिकीय उपाय किए जा सकते हैं? (उत्तर 250 शब्दों में दीजिए) 15 अंक

In spite of being preventable, stampedes due to improper crowd control mechanisms continue to claim lives in India. Discuss the underlying causes of such disasters. What institutional and technological measures can be taken for efficient crowd management? (Answer in 250 words) 15 Marks

The recent incident at Tirupati Temple, kumbha mela highlight the importance of proper crowd control mechanisms.

Underlying causes of such disasters -

(1) Exceeding the carrying capacity of the place

(2) Group think & crowd impatience.

(3) Lack of clear communication channels to disseminate relevant information

(4) Capacity building of staff to control the crowd.

(5) Lack of separate facilities for elders, women, children

Candidates must not write on this margin

Institutional measures - crowd management -

① Capacity building of armed forces
- ↳ Role play exercises
- ↳ understanding the mob behavior
- ↳ conducting mock drills.

② Rules to ensure enough security staff

③ Mandatory sharing of security plan for a big event to prevent lapses

④ Provision of limited entry, section wise entry, Pass system.

Technological measures

① Use of AI - facial recognition (FRT) & AI based camera for better surveillance of crowd.
e.g. kumbha mela, use of FRT

Candidates must not write on this margin

(2) Simulation for police & staff to better manage the crowd.

(3) E-pass system → for better Prediction of crowd.

(4) use of technology to dissemmate information regarding change of events, venues, schedules to Prevent Spread of misinformation
e.g.) apps to notify platform Change on railway station.

(5) use of drones & IOT to send notification if the capacity exceeds the permitted capacity

(6) Censor based alarm System.

Better management of crowd by institutional & technological changes, we can prevent hundreds of unfortunate ~~disasters~~ deaths

Space for Rough Work

Space for Rough Work

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CANDIDATES SHOULD READ THE UNDERMENTIONED INSTRUCTIONS CAREFULLY. VIOLATION OF ANY OF THE INSTRUCTIONS MAY LEAD TO PENALTY.

DONT'S

1. Do not write your name or registration no. anywhere inside this Question-cum-Answer Booklet.
2. Do not write anything other than the actual answers to the questions anywhere inside your QCA Booklet.
3. Do not tear off any pages from your QCA Booklet, if you find any page missing do not fail to notify the supervisor/invigilator.
4. Do not leave behind your QCA Booklet on your table unattended, it should be handed over to the invigilator after conclusion of the exam.

DO'S

1. Read the Instructions on the cover page and strictly follow them.
2. Write your registration number and other particulars, in the space provided on the cover of QCA Booklet.
3. Write legibly and neatly. Do not write in bad/illegible handwritings.
4. For rough notes or calculation, the last two blank pages of this booklet should be used. The rough notes should be crossed through afterwards.
5. If you wish to cancel any work, draw your pen through it or write "Cancelled" across it, otherwise it may be evaluated.
6. Handover your QCA Booklet personally to the invigilator before leaving the examination hall.

SPECIAL REQUEST FOR CANDIDATE AVAILING ONLINE FACILITY

1. Scan the QCA booklet properly. We suggest the uses of the app CAM scanner (Scan QR code in page 2) based on our previous experiences.
2. Please scan the QCA booklet in ample light. Copies scanned under moderate light can hamper evaluation quality.
3. Any page/pdf having shadow needs to be rescanned. Please make sure that the pdf that you upload is as clean as possible.
4. **Candidates not using the QCA booklet** must mention their details on the front page. And leave the next page blank for the macro comments. It must be understood that the answer should start from Page no. 3 in of the scanned pdf.
5. Candidates not using the QCA booklet must follow the sequence of the answer as per the question paper.
6. Please check the sequence of the answer and total number of pages in the scanned version. Make sure it is in consonance with the physical version of the same.

महत्वपूर्ण निर्देश

अभ्यर्थियों को निम्नलिखित निर्देशों को ध्यानपूर्वक पढ़ना चाहिए। किसी भी निर्देश का उल्लंघन करने पर दण्डित किया जा सकता है।

क्या न करें-

1. इस प्रश्न-सह-उत्तर पुस्तिका के भीतर कहीं भी अपना नाम या पंजीकरण संख्या न लिखें।
2. अपनी QCA पुस्तिका में कहीं भी प्रश्नों के वास्तविक उत्तरों के अलावा कुछ भी न लिखें।
3. अपनी QCA पुस्तिका से कोई भी पृष्ठ न फाड़ें, यदि आपको कोई पृष्ठ गायब लगे, तो पर्यवेक्षक/निरीक्षक को सूचित करना न भूलें।
4. अपनी QCA पुस्तिका को अपनी टेबल पर न छोड़ें, परीक्षा समाप्त होने के पश्चात इसे निरीक्षक को सौंप देना चाहिए।

क्या करें-

1. कवर पृष्ठ पर दिए गए निर्देशों को ध्यान पूर्वक पढ़ें और उनका सख्ती से पालन करें।
2. QCA पुस्तिका के कवर पृष्ठ पर दिए गए स्थान पर अपना पंजीकरण नंबर और अन्य विवरण लिखें।
3. स्पष्ट और पठनीय तरीके से लिखें। खराब/अपठनीय लिखावट में न लिखें।
4. रफ नोट्स या गणना के लिए, इस पुस्तिका के अंतिम दो खाली पृष्ठों का उपयोग किया जाना चाहिए। रफ नोट्स को बाद में क्रॉस कर देना चाहिए।
5. यदि आप किसी कार्य को रद्द करना चाहते हैं, तो उस पर अपना पेन चलाएं या उस पर "रद्द" लिखें, अन्यथा उसका मूल्यांकन किया जा सकता है।
6. परीक्षा हॉल छोड़ने से पहले अपनी QCA पुस्तिका व्यक्तिगत रूप से निरीक्षक को सौंप दें।

ऑनलाइन सुविधा का लाभ उठाने वाले अभ्यर्थियों के लिए विशेष अनुरोध

1. QCA पुस्तिका को ठीक से स्कैन करें। हम चाहेंगे कि आप स्कैनिंग के लिए कैमस्कैनर ऐप (CAM SCANER) का प्रयोग करें। (यह कोई प्रमोशन नहीं है)।
2. कृपया QCA पुस्तिका को पर्याप्त रोशनी में स्कैन करें। कम रोशनी में स्कैन की गई पुस्तिकाएं, उनके मूल्यांकन की गुणवत्ता को बाधित कर सकती हैं।
3. स्कैन के दौरान छाया वाले किसी भी पृष्ठ/पीडीएफ को फिर से स्कैन किया जाना चाहिए। कृपया सुनिश्चित करें कि आपके द्वारा अपलोड की गई पीडीएफ यथा संभव स्पष्ट हो ।
4. QCA पुस्तिका का उपयोग नहीं करने वाले उम्मीदवारों को अपना विवरण पहले पृष्ठ पर देना चाहिए और मैक्रो टिप्पणियों के लिए अगला पृष्ठ खाली छोड़ दें। यह समझना चाहिए कि उत्तर स्कैन की गई पीडीएफ में पृष्ठ नंबर 3 से शुरू होना चाहिए।
5. QCA पुस्तिका का उपयोग नहीं करने वाले उम्मीदवारों को प्रश्नपत्र के अनुसार उत्तर के अनुक्रम का पालन करना चाहिए।
6. कृपया स्कैन किए गए संस्करण में उत्तर के अनुक्रम और कुल पृष्ठों की संख्या की जाँच करें। सुनिश्चित करें कि यह उसी के भौतिक संस्करण के अनुरूप है।