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GENERAL STUDIES (TEST CODE : 1511)

Name of Candidate	SURBHI GOYAL		
Medium Eng./Hindi	ENGLISH	Registration Number	578542
Center		Date	25.11.21

INDEX TABLE

Q. No.	Maximum Marks	Marks Obtained
1	10	
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11	15	
12	15	
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16	15	
17	15	
18	15	
19	15	
20	15	

Total Marks Obtained:

Remarks:

INSTRUCTIONS

1. Do furnish the appropriate details in the answer sheet (viz. Name, Registration Number and Test Code).
   उत्तर पुस्तिका में सूचनाएं भरना आवश्यक है (नाम, प्रश्न–पत्र कोड, विद्यार्थी क्रमांक आदि)।
2. There are **TWENTY** questions printed in **ENGLISH & HINDI**
   इसमें बीस प्रश्न हैं अंग्रेजी और हिन्दी में छपे हैं।
3. **All questions are compulsory.**
   सभी प्रश्न अनिवार्य हैं।
4. The number of marks carried by a question/part is indicated against it.
   प्रत्येक प्रश्न/भाग के अंक उसके सामने दिए गए हैं।
5. 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. No marks will be given for answers written in medium other that the authorized one.
   प्रश्नों के उत्तर उसी माध्यम में लिखे जाने चाहिए जिसका उल्लेख आपके प्रवेश पत्र में किया गया है और उस माध्यम का स्पष्ट उल्लेख प्रश्न–सह–उत्तर (क्यूसीए) पुस्तिका के मुख्य पृष्ठ पर अंकित निर्दिष्ट स्थान पर किया जाना चाहिए। उल्लिखित माध्यम के अतिरिक्त अन्य किसी माध्यम में लिए गए उत्तर पर कोई अंक नहीं मिलेंगे।
6. Word limit in questions, if specified, should be adhered to.
   प्रश्नों में शब्द सीमा, जहाँ विनिर्दिष्ट है, का अनुसरण किया जाना चाहिए।
7. Any page or portion of the page left blank in the Question-Cum-Answer Booklet must be clearly struck off.
   उत्तर पुस्तिका में खाली छोड़ा हुआ पृष्ठ या उसके अंश को स्पष्ट रूप से काटा जाना चाहिए।

EVALUATION INDICATORS

1. Contextual Competence
2. Content Competence
3. Language Competence
4. Introduction Competence
5. Structure - Presentation Competence
6. Conclusion Competence

Time taken : 2 hours 58 min

Overall Macro Comments / feedback / suggestions on Answer Booklet:

1.

2.

3.

4.

5.

6.

All the Best

Don't write anything this margin (इस भाग में कुछ ना लिखें)

1. Despite a vast coast line and a number of waterways, why has India not been able to achieve its potential in bringing a significant modal shift from rail and road to waterways? **(150 words) 10**

विस्तृत तट रेखा और अनेक जलमार्गों के बावजूद, भारत रेल और सड़क परिवहन प्रणाली से जलमार्गों की दिशा में महत्वपूर्ण प्रणालीगत परिवर्तन (मोडल शिफ्ट) करने हेतु अपनी क्षमता को सार्थक करने में क्यों असमर्थ रहा है?

India has a vast coastline of 7500Km and developed 5 National waterways.

Though maritime sector accounts for 90% of India's trade by volume, the same cannot be said by inland waterways.

Challenges to bringing modal shift to waterway from rail-road :-

① Lack of infrastructure : While road and rail infrastructure is ubiquitous, same cannot be said for waterways.

② Vast geography and difficulty to develop waterways as a prominent mode of transport due to vast land.

③ Lack of inter-modal connectivity at existing waterways, who arent connected to

hinterland by rail and road architecture

④ Problem of silting : Rivers often develop silt and must be periodically dredged to maintain depth for ship movement.

⑤ Damage to environment : Development of waterways poses harm to maintaining minimum ecological flows in river as also aquatic biodiversity.

However, government is taking steps like Sagarmala and Varanasi freight park to revive waterways, just like in ancient times.

2. The move to establish a National Bank for Financing Infrastructure and Development, to reverse the drag on India's growth potential will have its own set of challenges. Discuss. **(150 words) 10**

भारत की संवृद्धि क्षमता संबंधी अवरोधों को व्युत्क्रमित करने के लिए एक राष्ट्रीय अवसंरचना वित्तपोषण और विकास बैंक की स्थापना के कदम की अपनी स्वाभाविक चुनौतियां होंगी। चर्चा कीजिए।

Recently, Budget 2021 proposed setting up National Bank for Financing Infrastructure and Development for encouraging financing of infrastructure projects.

Challenges in establishing the bank :-

① Ensuring sustainability: As many infrastructure projects become unviable due to low user charges, delays, judicial activism, etc, the loan taken by infrastructure project becomes NPA.

② Need for adequate capital for stable sources and not relying on issuance of bonds, to ensure asset-liability mismatch doesn't occur.

③ Effective management : Often, management

of public sector banks is marred with political interference, that must be avoided.

④ Choosing the right projects with proper KyC, as money will be stuck in the project for a long time.

Despite the challenges, this bank can help India realise its goal of $5 trillion economy by mobilising infrastructure investments.

3. Highlighting the issues related to the current fertilizer subsidy regime in India, discuss the need for reforms in this context. **(150 words) 10**

भारत में वर्तमान उर्वरक सब्सिडी व्यवस्था से संबंधित मुद्दों को रेखांकित करते हुए, इस संदर्भ में सुधारों की आवश्यकता पर चर्चा कीजिए।

Fertiliser subsidy in India is 2nd largest subsidy component, after food subsidy. In 2021-22 Budget, it accounted for Rs 1.3 lakh crore.

Issues in current fertiliser subsidy regime :-

① Mainly focussed on urea as 70% fertiliser subsidy targets urea.

② This biasness leads to negative environmental consequences due to overuse of urea fertiliser, available at cheaper rate.

eg:

	N	P	K
Normal	4	2	1
Punjab	31.4	8	1

Ratio of fertiliser use

N = Nitrogen
P = Phosphorous
K = Potassium

③ Fertiliser subsidies strains the fiscal capacity of government, leading to huge backlogs

in Payments, equalling Rs 570 billion. This questions the sustainability of the subsidies.

④ Mainly subsidy benefits are cornered by

- large states (Punjab, Haryana)
- large farmers (14% of total)

Need for reforms:

The above issues highlight that fertiliser subsidy needs to be rationalised.

① Need to include urea in Nutrient Based Subsidy scheme to limit its wrong usage.

② Make farmers pay for extra purchase of urea than required by fields.

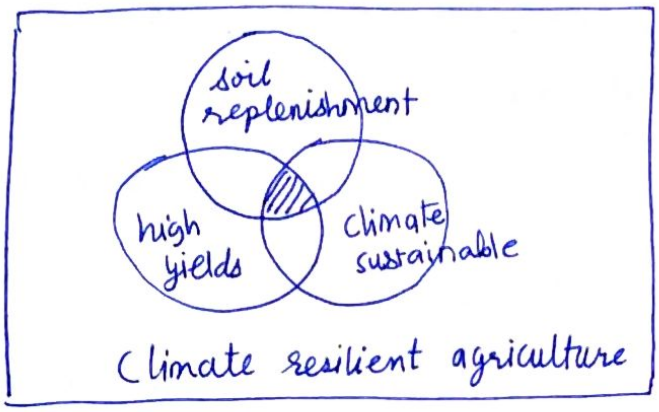
Finally, recommendations of Ashok Dalwai Committee can prove useful to manage fertiliser subsidy.

4. Identifying the need for a climate resilient agriculture in India, discuss how it can be achieved. **(150 words) 10**

भारत में जलवायु प्रत्यास्थ कृषि की आवश्यकता की पहचान करते हुए, चर्चा कीजिए कि इसे कैसे प्राप्त किया जा सकता है।

In India, agriculture contributes to 18% of total greenhouse gases (GHG) emissions.

Need for climate resilient agriculture:



① Highest amount of GHG emissions come from animal husbandry: Digestion process of livestock animals releases methane gas.

② Rice cultivation in pool of water leads to anaerobic decomposition and releases methane and nitrous oxide gases.

③ Further, use of nitrogen/urea fertiliser contributes to global warming.

④ Burning of paddy by farmers also harms

climate.

⑤ since 55% net sown area is rainfall dependant, it creates uncertainities.

⑥ As per Ministry of Earth Sciences report, droughts can decrease agricultural productivity by 50%.

6.1. Further, weather changes can lower yields of rabi crops by 20%.

⑦ In India, 76% farmer suicides occur in rainfed farms.

Measures to achieve climate resilient agriculture

① Organic farming and zero budget natural farming can improve soil quality.

② Crop diversification and crop rotation to millets, pulses, etc for withstanding rainfall changes.

③ Use of microwatershed like bunds to ensure irrigation.

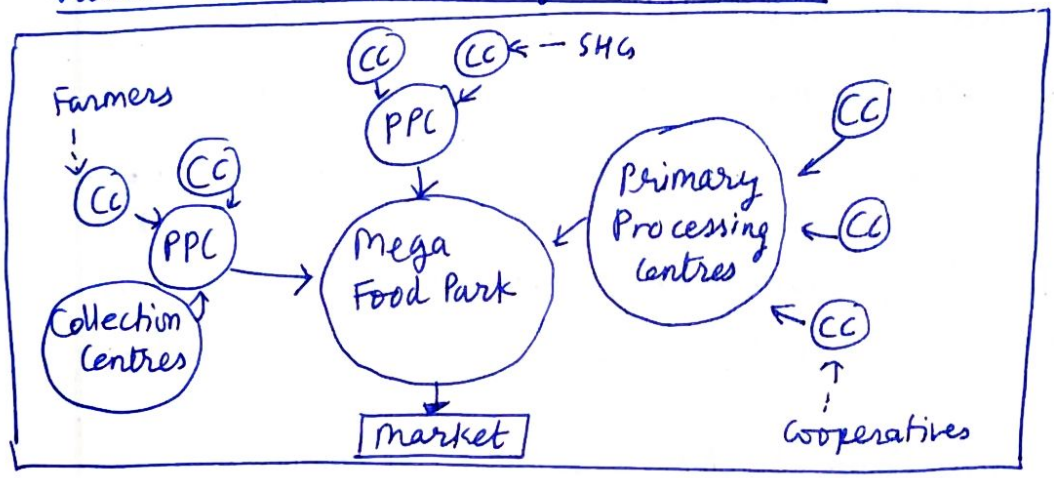
It is important to achieve climate resilient agriculture for sustainable Development Goal 2.

5. Mega Food Parks (MFPs) were considered to be a gamechanger for the food processing sector in India, but their progress remains stunted. Discuss.

(150 words) 10

मेगा फूड पार्कों (MFPs) को भारत में खाद्य प्रसंस्करण क्षेत्रक के लिए एक महत्वपूर्ण चरण (गेमचेंजर) समझा गया था, लेकिन उनकी प्रगति अभी भी अवरुद्ध है। चर्चा कीजिए।

Mega Food Parks (MFP) are food processing clusters, based on hub and spoke model, to ensure value addition along supply chain.



Gamechanging nature of Mega Food Parks:

① Addressing the entire value chain from processing, waxing, branding, packaging, etc for holistic product development.

② Focus on quality and safety standards to ensure product remains eligible for export market.

③ Developing human expertise and skilling

(A) Backward and forward linkages of food parks with farmers, cooperatives, etc on one hand and processors, distributors, retailers on other.

Stunted progress of Mega Food Parks:

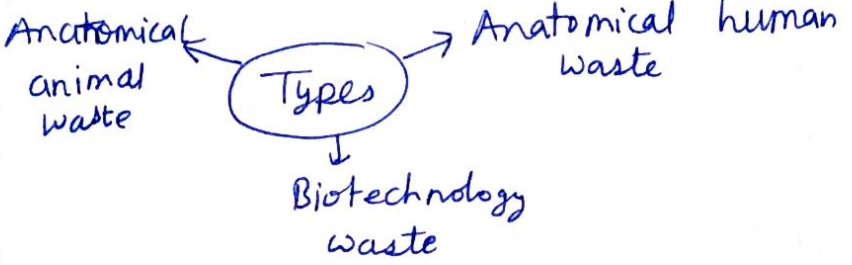
1. Lack of adequate land that is connected to both farmers and markets. MFPs have become isolated units in themselves.
2. Further, only focus on exports and ignoring domestic market has hurt their growth.
3. Mega Food Parks are not developing diverse food products that may attract consumer attention.

The scheme of mega food parks needs to be revived and strengthened.

6. Give an account of the challenges associated with rapidly increasing biomedical waste in India. Also, state the key features of the Bio-medical Waste Management (Amendment) Rules, 2018. **(150 words) 10**

भारत में तीव्रता से बढ़ रहे जैव-चिकित्सा अपशिष्ट से जुड़ी चुनौतियों का विवरण दीजिए। साथ ही, जैव-चिकित्सा अपशिष्ट प्रबंधन (संशोधन) नियम, 2018 की प्रमुख विशेषताओं का भी उल्लेख कीजिए।

Biomedical waste refers to waste generated in hospitals, blood labs, vaccination centres, etc.



Challenges with increasing biomedical waste:

With COVID, biomedical waste has increased from 500 gm/bed daily to 2.5–4 kg/bed daily.

① Difficulty in storage and handling in safe manner as hospitals have limited capacity.

② Improper handling can lead to accidents like fire.

③ Possibility of spread of infection from handling of biomedical wastes.

④ Huge amount of waste generation is also

causing challenges at incineration plants for disposal.

Key Features of Biomedical Waste Management Rules 2018 :-

1. It phases out the use of chlorinated blood bags, gloves, etc.
2. It standardises sterlise on site and pretreatment as per WHO norms.
3. All hospitals are required to dispose waste within 48 hours at common disposal facilities. Its mandates use of GPS and RFID technology to track waste movement.
4. A central registry maintains database for bedded as well as non-bedded hospitals.
5. Waste is segregated in 4 streams for disposal.

Effective biomedical waste management is essential to stop spread of antimicrobial resistance and infectious diseases.

7. What do you understand by impact based forecasting in disaster management? How can such forecasting strengthen the disaster management preparedness? **(150 words) 10**

आपदा प्रबंधन में प्रभाव आधारित पूर्वानुमान से आप क्या समझते हैं? ऐसा पूर्वानुमान आपदा प्रबंधन की तैयारियों को कैसे मजबूत कर सकता है?

Impact based forecasting refers to prediction of disaster and associated plan preparation based on their impact on man, society and environment.

① It ensures a constructive and rehabilitative approach to disaster management.

② This approach prevents the occurrence of harmful effects of disaster.
eg: Building flood resistant designs in buildings to avoid their breakdown during disaster like in ~~Kerala~~ Netherlands

③ It focuses on preparedness before hand based on possible impacts at different sections of society.
Eg: Building water harvesting structures and watershed approach to tackle droughts.
3.1

3.2. Similarly, since it is known that floods impact telephone connectivity, it is essential to develop alternate communication system beforehand like transponders.

Thus, impact based forecasting helps to strengthen disaster management and brings us closer to Sustainable Development Goal 11.

8. Low Earth Orbit is becoming increasingly crowded as countries race to launch satellites into space. Highlighting the associated issues, discuss international efforts taken in this regard. **(150 words) 10**

देशों द्वारा अंतरिक्ष में उपग्रहों को प्रक्षेपित करने की बढ़ती होड़ से निम्न भू-कक्षा में इनका संकेद्रण बढ़ता ही जा रहा है। इससे संबंधित मुद्दों को रेखांकित करते हुए, इस संबंध में किए गए अंतर्राष्ट्रीय प्रयासों पर चर्चा कीजिए।

Low Earth Orbit (LEO) extends till 2000 km from Earth's surface. It mainly includes satellites for observation and reconnaisance.

Issues of crowded Low Earth orbit :-

(1) Space debris: 70% space debris are in LEO, totalling 5 lakh.
- This increases vulnerability to Kessler Syndrome, which means generation of more debris by collision of existing ones.

(2) Possibility of spying and reconnaissance operations as satellites are closeby.

(3) Threat of collision to existing satellites by large number of space debris.

(4) Challenge to human operations who can be hurt by debris. This increases the cost

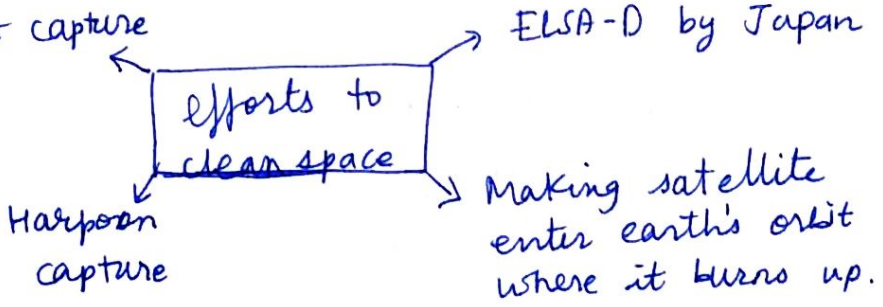
in designing products for space launch.

International efforts to tackle it:

① ISRO has launched NETRA program to ensure its satellites are not hit by debris.

② Globally, countries have agreed to deorbit satellites within 25 years of end of life. But 60% countries only follow this rule.

③

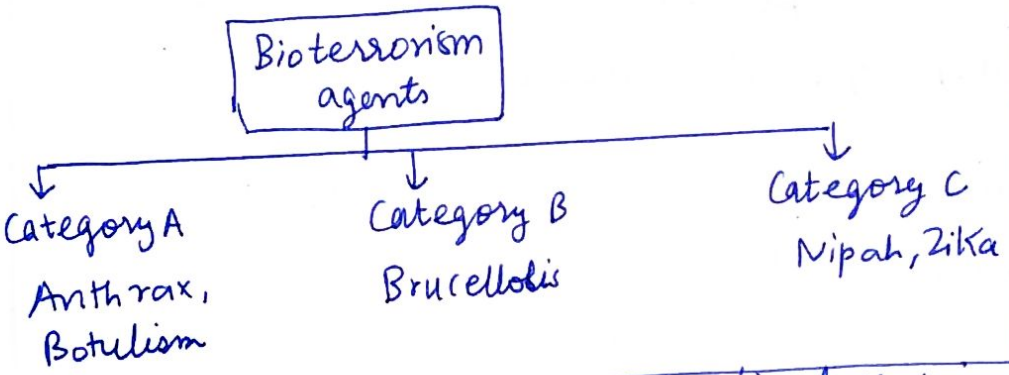


Thus, use of space resource must be done sustainably, without having intentions to militarise it.

9. Enumerating the existing measures to counter bio-terrorism in India, highlight the need for a bio-terrorism law. **(150 words) 10**

भारत में जैव-आतंकवाद का मुकाबला करने के लिए मौजूदा उपायों को सूचीबद्ध करते हुए, एक जैव-आतंकवाद कानून की आवश्यकता को रेखांकित कीजिए।

The spread of COVID-19 in world has raised concerns for Bioterrorism. It refers to intentional use of microorganisms to destroy a particular population in short period of time.



Existing measures to deal with bio-terrorism

(1) 50% forces of National Disaster Response Force are trained to handle biological disasters.

(2) Cartegana Protocol on Biosafety provides rules for safe handling of biologically modified organisms.

(3) WHO's Public Health Emergency of International concern stipulates steps to warn the

nations in case of spread of epidemic.

④ Integrated Disease Surveillance Program in India to monitor the spread of diseases and epidemics.

Need for law on bio-terrorism:

① Large vulnerable population with high density per km^2 increases the risk of easy spread of diseases.

② Inadequate healthcare system was highlighted during COVID pandemic, which cant treat so many people at once.

③ Threat to National security: Countries can weaken the security response by bioterrorism and then attack.

Thus, recently Parliamentary Standing Committee on Health suggested formulating law on bio-terrorism.

10. Discuss the potential of "Integrated Law Enforcement Centres" and "Smart Walls" on India's border areas to address the prevailing security challenges.
(150 words) 10

मौजूदा सुरक्षा चुनौतियों से निपटने के लिए भारत के सीमावर्ती क्षेत्रों में "एकीकृत कानून प्रवर्तन केंद्रों" और "स्मार्ट वॉल" की क्षमता पर चर्चा कीजिए।

India's border of 10,506 km poses multiple security threats, that must be neutralised to ensure safety and trade across borders.

Potential of Integrated Law Enforcement Centres :-

(1) Such Integrated check posts have been established by India at border with Pakistan, Bangladesh and Myanmar.

(2) They can help to tackle all the regulatory issues including trade, migration, crime, etc

(3) It eliminates the need to deploy multiple ressonnels for ~~various~~ different law enforcements.

(4) Unified personnel can be more effective in dealing with inter connected issues.

Potential of "Smart Wall"

① India has deployed smart walls through Comprehensive Integrated Border Management System along borders with Pakistan and Bangladesh.

② These smart walls integrate land, water, air and underground surveillance.

③ It further uses multiple technologies like laser, sonar, radar, etc in addition to manual surveillance

Such innovative steps can go a long way in making India's border more secure and border communities safer.

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11. Farm loan waivers are neither adequate nor recommended for promoting sustained agricultural growth. Analyse. **(250 words) 15**

सतत कृषि विकास को बढ़ावा देने के लिए कृषि ऋण माफी न तो पर्याप्त है और न ही अनुशंसित। विश्लेषण कीजिए।

Farm loan waivers refers to payment of agricultural loans by government and exemption of farmers from doing the same.

Farm loan's waivers are inadequate :-

1. Only 60% farmers take loan from formal banks and rest depend on informal moneylenders, whose concerns remains unaddressed by waiver.

2. Farm loan waivers only helps the landowning farmers and not landless or tenant farmers.

3. As 15% of agricultural credit is given to small and marginal farmers, farm loan waivers mainly help big farmers, who are just 14% of total farmers.

Farm loan waivers are not recommended for sustained agricultural growth :-

① Farm loan waivers only help farmers superficially without addressing the underlying structural issues.

② It is assumed that farm loan waiver can lead to greater investment in agriculture by farmer, but it is untrue.

2.1. Since small and marginal farmers have monthy income of ₹6550 (NSSO 2016), any waiver only helps them to avoid additional burden.

③ Farm loan waivers create a culture of indiscipline among farmers, who wait for waivers to be announced.

④ Farm loan waviers have had no impact on farmer suicides. 76% suicides among farmers occured due to lack of irrigation

to their fields. Thus, structural reforms like access to irrigation, markets and proper returns on their crop is the need of the hour.

Farm loan waivers create unsustainability in agriculture, as farmers take loans hoping for waives. Instead, Ashok Dalwai committee recommendations can help in bringing structural reforms.

12. A number of initiatives in recent years have focussed on the MSME sector. Why is there a need to focus on this sector? Also, identify the measures taken by the government and further scope of action. **(250 words) 15**

हाल के वर्षों में अनेक पहलों ने MSME क्षेत्रक पर ध्यान केंद्रित किया है। इस क्षेत्रक पर ध्यान केंद्रित करने की आवश्यकता क्यों है? साथ ही, सरकार द्वारा उठाए गए कदमों और आगे की कार्रवाई के दायरे की पहचान कीजिए।

Micro, small and Medium Enterprises (MSME) are units with turnover limits upto ₹250 crore. They are engines of growth, responsible for 29% GDP of India.

Need to focus on MSME sector :-

① The sector is 2nd highest employment generator in India and therefore, needs high focus with 4.8% unemployment (PLFS 2021).

② Further, as 60% MSME units are located in rural areas, it can help shift agriculture dependant population as well as stop migration to urban areas.

③ Lack of access to credit: Only 8% MSMEs have access to formal banking channels

as banks are hesitant to loan to new businesses.

④ Lack of expertise in branding and marketing: Many MSMEs have good quality products, but need help and handholding to enhance their brand.

⑤ Weak capital base: MSMEs are generally suffering from shortage of funds.

⑥ Difficulty in retrieving payments for goods as large businesses delay payments.

Measures taken by government:-

① MUDRA, Standup India, PSB loans in 59 minutes.com are several steps to enhance access to loans to MSME.

② Increasing government procurement:
- 2.1. Via MSME Sambandh portal.
- 2.2. Public procurement orders mandates 25% procurement from MSMEs.

③ Schemes for employment generation

- SFURTI for traditional crafts
- Solar Charkha Mission
- ASPIRE
- Employment Generation Program

These schemes provide credit as well as training facilities to MSME.

④ Support during COVID by initiatives like Subordinate debt, 2% interest subvention, etc.

Further scope of action can be envisaged based on UK Sinha committee.

- Creation of distressed assets fund to help weak MSMEs
- Easy access to loans by eKyC
- Providing support by further relaxation of rules on MSMEs
- Handholding support by academia linkages

Thus, MSMEs must be strengthened as they contribute to 45% of exports from India.

13. Skilling the Indian population faces a 3E challenge - Education, Employment and Employability. Discuss. Also suggest interventions required to effectively manage this challenge. **(250 words) 15**

भारतीय जनसंख्या को कौशल युक्त बनाने में 3E चुनौतियों, यथा- शिक्षा (एजुकेशन), रोजगार (एम्प्लॉयमेंट) और नियोजनीयता (एम्प्लॉयबिलिटी) का सामना करना पड़ता है। चर्चा कीजिए। साथ ही, इन चुनौतियों का प्रभावी ढंग से प्रबंधन करने के लिए आवश्यक हस्तक्षेपों का भी सुझाव दीजिए।

Indian population of only 2·4% has been formally trained and skilled, compared to 96% in South Korea.

Challenges in skilling Indian population:-

① Education:-

1.1. Most students start dropping out after secondary school, resulting in low gross enrollment ratio of 53% and 26% for ~~class~~ Class XI-XII and higher education respectively.

1.2. The higher education is essential to gain skilling and productive employment.

1.3. Further, teaching in schools and colleges is not at high quality

and results in mere graduates without qualifications.

1.4. Teachers also often teach outdated curriculum irrelevant to skills needed in today's times.

② Employability :

2.1. Teaching in colleges often doesn't match with industrial demands.

2.2. This has resulted in low employability of Indian graduates.

2.3. India Skills report 2019 noted that only 46% graduates are employable.

2.4. Further, Aspiring minds report 2018 held that only 4% software engineering graduates are employable.

③ Employment :

3.1. Lack of productive job creation in the economy has led to underemployment of skilled people.

eg: IIT graduate working at Swiggy.

3.2. Employment opportunities must be created in formal sector for skilling and apprenticeship of individuals.

3.3. Periodic on site skilling is also required to keep employees upto date.

Interventions needed :-

① Skilling by sector specific Skill Councils must be upgraded periodically to match industry standards.

② Focus on generating high quality graduates from engineering colleges, instead of quantity, by regulating substandard colleges.

③ A person must be skilled in diverse jobs to ensure their employability.

Skilling Indian youth is essential for India to reap benefits of demographic dividend.

Don't write anything in margin (इस भाग में कुछ ना लिखें)

14. Despite its importance, agricultural marketing faces various institutional and infrastructural related issues in India. Elaborate. Also, enlist the measures that have been taken in this context. **(250 words) 15**

अपने महत्व के बावजूद, कृषि विपणन को भारत में विभिन्न संस्थागत और अवसंरचना संबंधी मुद्दों का सामना करना पड़ता है। सविस्तार वर्णन कीजिए। साथ ही, इस संदर्भ में किए गए उपायों को भी सूचीबद्ध कीजिए।

Agricultural marketing is a subject under state list and is regulated by state acts on Agriculture Produce market Committees (APMCs). These are designated as 1st place of sale of farm produce.

Issues faced by APMCs

Infrastructural:

① Lack of adequate infrastructure for proper handling and storage of produce eg:-

1.1. Only 10% APMCs have cold chain facilities.

1.2. Only 25% APMCs have common drying grounds.

② High market fees that amounts to 0.5%

~2% of crop submitted, but on adding other levies, reaches as high as 15%. This fees isn't spent on infrastructure improvement.

③ Weak backward and forward linkages of APMCs with farmer's fields as well as wholesale markets.

Institutional:

④ APMCs are dominated by scruplous middlemen and politically powerful merchants, who dont give proper prices to farmers.

⑤ The APMCs heads are often engaged in market manipulation by hoarding and creating artificial shortage, leading to inflation for consumers.

Measures taken :-

① Government had introduced farm law that allowed sale of agricultural

produce at any place without any fee. This competition may have forced APMCs to reform. However, the laws need to be remodelled.

② Essential Commodities Act imposes limits on hoarding and ensures adequate supply to markets.

③ e-Trading: Initiatives like e-NAM (National Agriculture Market) and e-RAKAM can help farmers directly connect with buyers along with real time price discovery.

④ Gramin Agriculture Market (GRAMs) so that farmers can sell their produce nearby, without having to travel to far located APMCs.

Recommendations of Ashok Dalwai committee can help India improve agriculture marketing infrastructure.

15. Marine litter is not just an environmental issue but poses a socio-economic challenge as well. Discuss. Also, enumerate the initiatives taken by the global community to reduce marine litter. **(250 words) 15**

समुद्री कचरा न सिर्फ एक पर्यावरणीय मुद्दा है, अपितु यह एक सामाजिक-आर्थिक चुनौती भी खड़ी करता है। चर्चा कीजिए। साथ ही, समुद्री कचरे को कम करने के लिए वैश्विक समुदाय द्वारा की गई पहलों को भी सूचीबद्ध कीजिए।

Marine litter refers to solid waste, processed or manufactured, that is discarded into sea/rivers or finds itself indirectly by stormwater, sewage or winds into sea.

80% marine litter comes from land based sources.

Challenges posed by marine litter:-

① Environmental issues:-

1.1. Decline in ecosystem productivity and disrupts niche and refugees

1.2. Damage to marine biodiversity that can ingest possible carcinogenic litter.

1.3. Such litter can lead to eutrophication and harmful algal blooms, creating dead zones in ocean ecosystem.

1.4. Rise in temperature by marine litter

Don't write anything in margin (इस भाग में कुछ ना लिखें)

Can result in stratification of oceans, harming nutrient recycling in oceans.

② Socio-economic issues:

2.1. Marine litter can harm the cultural identity and unique social heritage of the region.

2.2. It can damage the archaeological records located at ocean bottom.

2.3. Marine litter increases the cost of sea based activities like fishing and oil exploration.

Initiatives by international community:-

① London Convention (1972) prohibits disposal of waste by ships to protect the oceans.

② MARPOL convention under International maritime Organisation prohibits disposal of plastic waste by ships

or persons at sea.

③ Global Programme of Action to Protect Marine Environment and Global Action Plan against Marine Litter are other initiatives in this regard.

④ Steps have been taken to reduce North Pacific garbadge patch.

Thus, steps to tackle marine litter are essential to achieve sustainable oceans, as envisaged in Sustainable Development Goal 14.

Don't write anything in margin (इस भाग में कुछ ना लिखें)

Sciences

16. Assess India's vulnerability to flash floods and suggest measures for better resilience to flash floods. In this context, also briefly highlight the significance of recently launched Flash Flood Guidance System (FFGS) operated by the Indian Meteorological Department (IMD).

(250 words) 15

आकस्मिक बाढ़ के प्रति भारत की सुभेद्यता का आकलन कीजिए और इसके प्रति बेहतर लचीलेपन के उपायों का सुझाव दीजिए। इस संदर्भ में, हाल ही में आरंभ की गयी तथा भारत मौसम विज्ञान विभाग (IMD) द्वारा संचालित आकस्मिक बाढ़ मार्गदर्शन प्रणाली (FFGS) के महत्व पर भी प्रकाश डालिए।

Flash floods refers to sudden floods in a short interval of time, that exceeds the capacity of drainage networks.

India's vulnerability to flash floods:-

① Urban Congested cities like Mumbai, Chennai and Delhi often witness flash floods due to poor drainage network and building infrastructure.

② Encroachment of watersheds and wetlands prevents water from being absorbed as groundwater.

③ With climate change, the intensity of rainfall will increase. as per Ministry of Earth

Sciences report. This increases India's vulnerability to flash floods.

Measures for better resilience to flash floods:-

① Need for better urban planning: Creating green spaces for water from sudden rainfall to percolate.

② Better drainage construction that can handle peak flows, instead of choking the city.

③ Removing encroachment on wetlands and other ecosystems to ensure water is controlled, as mangroves act as natural buffer.

④ Creating early warning system like IFLOWS in Mumbai to determine in advance and take evacuation measures.

Significance of Flash Flood Guidance System

- Impact based evacuation and rehabilitation
- Evidence based evacuation steps
- Early Warning system
- Regulation of dams and bunds to release water

India must adequately manage risk to flash floods as per Sendai Framework guidelines.

17. Hydrogen based energy production can play a key role in a clean, secure and affordable energy future. In this context, identify the potential and opportunities for utilising hydrogen based technologies. What are the challenges that need to be addressed to fullfill the potential?

(250 words) 15

हाइड्रोजन आधारित ऊर्जा उत्पादन एक स्वच्छ, सुरक्षित और वहनीय ऊर्जा के भविष्य में महत्वपूर्ण भूमिका निभा सकता है। इस संदर्भ में, हाइड्रोजन आधारित प्रौद्योगिकियों के उपयोग करने की संभावनाओं और अवसरों की पहचान कीजिए। इस क्षमता को साकार करने के लिए किन चुनौतियों का समाधान करने की आवश्यकता है?

Hydrogen based energy production makes use of hydrogen fuel cells by electro-chemical reactions to generate heat and energy.

Potential and opportunities for utilising Hydrogen energy :-

① Source of clean energy : Hydrogen emits no greenhouse gases, unlike other fuels like coal and petroleum.

② Widely available : Hydrogen is abundant in nature and therefore a sustainable source of energy.

③ Higher energy density : Hydrogen is 20-30% times more efficient than petroleum and can be even used to fuel rockets.

Don't write anything in margin (इस भाग में कुछ ना लिखें)

④ Curbing India's imports : Since India has to rely on 85% imports for crude oil, Hydrogen use can save India's foreign reserves.

⑤ Ease of setting up and making changes: Its modular arrangement ensures it can be setup in decentralised manner to remote locations and changes can be made.

⑥ Faster recharging of Hydrogen cells compared to electrical vehicles.

Challenges :-

① Reliance on fossil fuels to separate hydrogen from water adds to green house gas emissions.

② Highly inflammable and thus, it must be cobled and stored at high pressure inside pipelines.

(2) No smell of hydrogen makes it difficult to detect leakages.

(3) Need of adequate pipeline infrastructure to transport and store hydrogen energy.

The Indian government recently proposed Green Hydrogen Mission in Budget 2021 to support its development.

Don't write anything in margin (इस भाग में कुछ ना लिखें)

18. Despite the huge promise of satellite-based internet connectivity, it hasn't gained traction on a significant commercial scale, especially in India. Discuss. **(250 words) 15**

उपग्रह आधारित इंटरनेट कनेक्टिविटी में निहित विशाल संभावना के बावजूद, इसने विशेष रूप से भारत में, वाणिज्यिक पैमाने पर महत्वपूर्ण पकड़ स्थापित नहीं किया है। चर्चा कीजिए।

Satellite based internet connectivity involves broadband connection and internet to users by connection from satellites.

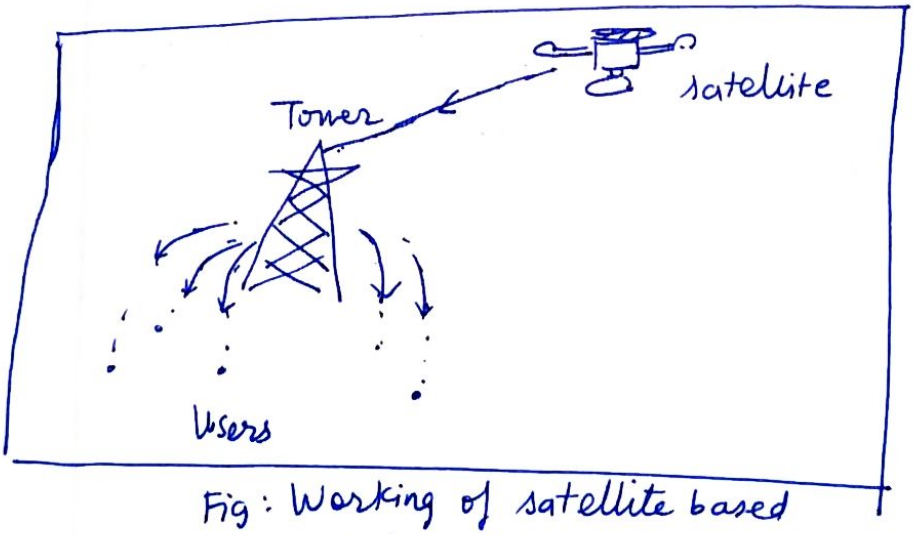

Fig: Working of satellite based internet

Promise offered :-

① **High bandwidth** : satellite based connectivity can function at peak bandwidth and doesnt show delays during peak hours.

② **Ability to reach remote and inaccessible**

locations to provide internet services.

③ Use in multitude of applications ranging from smart grids, railways to agriculture sector.

④ High quality internet connection as satellites are transferring direct signals.

Challenges to satellite based internet connectivity :-

① Higher cost : It is 15-20 times costlier than conventional internet connections ($0.6) at $8.5 per byte.

② Disturbance by atmospheric conditions : Presence of clouds, etc can trampel the connection.

③ India doesnt allow accessing satellite based connection by individual private operators.

④ Possibility of high space debris to proide internet.

⑤ Further, challenges to astronomy as light

from satellites can hamper the study of astronomical objects.

Thus, satellite based internet connectivity must be developed keeping challenges in mind. eg: SpaceX developed DarkSat to avoid emitting light which disturbs astronomy.

19. India's attempts at strengthening its intelligence infrastructure and capabilities have historically been reactive and incremental, rather than holistic and sustainable. Discuss. Also, provide a concrete framework in transforming the country's intelligence capabilities.

(250 words) 15

अपनी आसूचना अवसंरचना और क्षमताओं को मजबूत करने के भारत के प्रयास समग्र और स्थायी होने के बजाय ऐतिहासिक रूप से प्रतिक्रियाशील और वृद्धिशील रहे हैं। चर्चा कीजिए। साथ ही, देश की आसूचना क्षमताओं के रूपांतरण हेतु एक ठोस ढांचा भी प्रदान कीजिए।

Intelligence infrastructure of a country helps track, intercept, monitor and alert the security architecture of any possible threats to country.

India's strengthening of intelligence infrastructure has been incremental and reactive :-

① India has created its various intelligence agencies over a period of time, instead of comprehensive and holistic approach.

② India developed National Investigation Agency (NIA) and National Intelligence Grid (NATGRID) in response to 2008 Mumbai terror attacks.

③ Similarly, Defense Space Agency was developed recently in light of increasing space warfare by USA and Russia.

④ However, many aspects of India's intelligence architecture are holistic and sustainable.

eg: Cyber security architecture consisting of CERT-IN, National cybersecurity coordination centre, cyber swachhta kendras, etc.

Framework to transform India's intelligence capabilities:-

① India needs to evolve a comprehensive national security strategy so that intelligence gathering can occur along that lines.

② Further, there is need for National Security Coordinator to coordinate intelligence

between different agencies, as suggested by Naresh Chandra Committee.

(3) Further, use of technology like Bigdata, Artificial intelligence, robotics, drones, etc can play key role in strengthening intelligence architecture.

Finally, recommendations of Shekatkar committee may also prove useful to achieve intelligence reforms.

Don't write anything in margin (इस भाग में कुछ ना लिखें)

20. In light of the prominent instances of drone attacks by both state and non state actors, assess the challenges and capabilities of India in dealing with such security threats. **(250 words) 15**

राज्य और गैर-राज्य दोनों अभिकर्ताओं द्वारा ड्रोन हमलों के प्रमुख दृष्टांतों के परिप्रेक्ष्य में, ऐसे सुरक्षा खतरों से निपटने में भारत की चुनौतियों और क्षमताओं का आकलन कीजिए।

Drones are robotic aircrafts that are unmanned and able to move over a defined trajectory, without being witnessed.

Instances of drone attacks are rising by both state and non-state actors.

1. Reports reveal 50-60,000 illegal drones operating in India.
2. Further, 2020 saw more than 160 drone movements from Line of Control towards India.
3. Such drone attacks are highly prevalent in Kashmir.
4. Recently, units of Left Wing extremists also used drones to attack security forces in Maharashtra.

Challenges faced by India:

1. Lack of designated standard operating

procedure (SOP) in case of drone attacks.

② Drones often move undetected against borders, as border signals are unable to capture drone movement.

③ Possibility of attack at vulnerable locations like army base camps, hospitals, nuclear facilities, etc.

④ Absence of technology to neutralise drones within seconds of their entry into India.

Capabilities of India:-

① India was able to successfully neutralise drone attacks launched by Pakistani side in 2021. This shows military capacity to deal with such attacks.

② Presence of cyber security architecture like CERT-IN and Critical Infrastructure Protection Centre can help in detecting

and minimising impact of drones.

③ India has already developed drone regulation guidelines to deal with unregulated non-state actors drones.

3.1. It has No permission no take off clause that prohibits operations of drones without permission.

Even globally, drones are being used to attack like saudi Arabia's oil fields and Iran's military general. Thus, India must develop its capacities in this regard.