GS SCORE

TEST - 4

SCIENCE & TECHNOLOGY AND ENVIRONMENT

Time Allowed: 3 hrs. *Max. Marks: 250*

Q.	Marks
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20.	

Instructions to Candidate

- There are 20 questions.
- All questions are compulsory.
- The number of marks carried by a question is indicated against it.
- Answers to questions no. 1 to 10 should be in 150 words, whereas answers to questions no. 11 to 20 should be in 250 words.
- Keep the word limit indicated in the questions in mind.
- Answers must be written within the space provided.
- Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.

76 1/2

Name SHUBHAM KUNDAL

Roll No. _____

Mobile No. _____

Date _____

Signature _____

1. Invigilator Signature _____

2. Invigilator Signature _____

REMARKS

GS SCORE

Roll No.

GS SCORE
GS MAINS TEST SERIES 2018

Section - A

Q1. "Bay Of Bengal Large Marine Ecosystem Project (BOBLME) has tried to mitigate trans-boundary issues affecting marine ecosystem effectively." Critically Analyse. (10 Marks)

BOBLME is an initiative by government of India in collaboration with other partners including civil society, neighbour nations to tackle the deteriorating Bay of Bengal Marine Ecosystem

Decent start

It envisages co-operation with Bay of Bengal littoral countries Bangladesh, Myanmar, Thailand etc

Initiatives & Principles

- Responsible & sustainable coast led development
- Joint collaborations
- Research & Development
- Fishermen & other marine community awareness

Elaborate

It also envisages joint action on transboundary & common issues like PLASTICS & MICROPLASTICS, Waste disposal, Sustainable FISHING, SHIPPING POLLUTION etc

Good points

Achievements → Platform to share concerns
→ Joint collaboration
- knowledge sharing
- Awareness & education value

Elaborate

However, the success on ground has been limited as →
- but enforcement remains lax
- lack of alternatives to plastics etc
- technological know-how is lacking
- poor economies

Elaborate

Suitable platforms like UNEP, WMO & NGOs like Greenpeace etc must pitch in along with greater commitment from countries for result.

MARPOL

Good conclusion

Remarks

GS SCORE
GS MAINS TEST SERIES 2019

Q2. "Apart from affecting polar ice caps, Black Carbon has significantly contributed in receding Himalayas." Analyse. (10 Marks)

The recent Hindukush-Himalaya report points to the melting status of the largest source of frozen water on earth after the poles. Decent intro

Black carbon is formed due to incomplete combustion of fossil fuels like coal etc.

Effects of Black carbon

Black carbon sticks to the mountain surface & increases the heat absorbing capacity of snow capped mountains (Albedo change) Good

Non Black Carbon Mountains (High ALBEDO)

Black Carbon (Absorbs heat) (LOW ALBEDO)

Remarks

→ It also affects the overall atmosphere by increasing the temperature due to it's absorbing potential (GLOBAL WARMING). This lead to melting polar ice caps as well as mountains. (GHG effect)

→ It also causes changes in the atmosphere. Changing atmospheric composition & leading to erratic weather phenomenon
eg. rainfall pattern disrupted.

Improper combustion leading to BLACK & BROWN Carbon must be tackled on a priority ~~to increase~~ in wake of the IPCC 2018 report.

Focus should be more impact of receding Himalayan glaciers on India and Indian subcontinent
eg. Impact on perennial rivers and Indian agriculture etc.

Decent conclusion

Remark

3

GS SCORE
GS MAINS TEST SERIES 2019

Q3. India has banned bottom trawling in few areas while Sri Lanka has banned it completely. Critically analyse the impact of bottom trawling and deep sea mining on aquatic ecosystem. (10 Marks)

India is a diverse country & coastal life country and employability is directly linked with fishing & other marine activities. } Decent Intro in context

Fishermen (especially in the Tamil Nadu coast) use bottom trawling to capture maximum fishes & marine organisms However, it leads to -:

→ Disturbing the sea/ocean floor → eg. Noise pollution, turbidity etc

→ Damages ocean floor flora & fauna

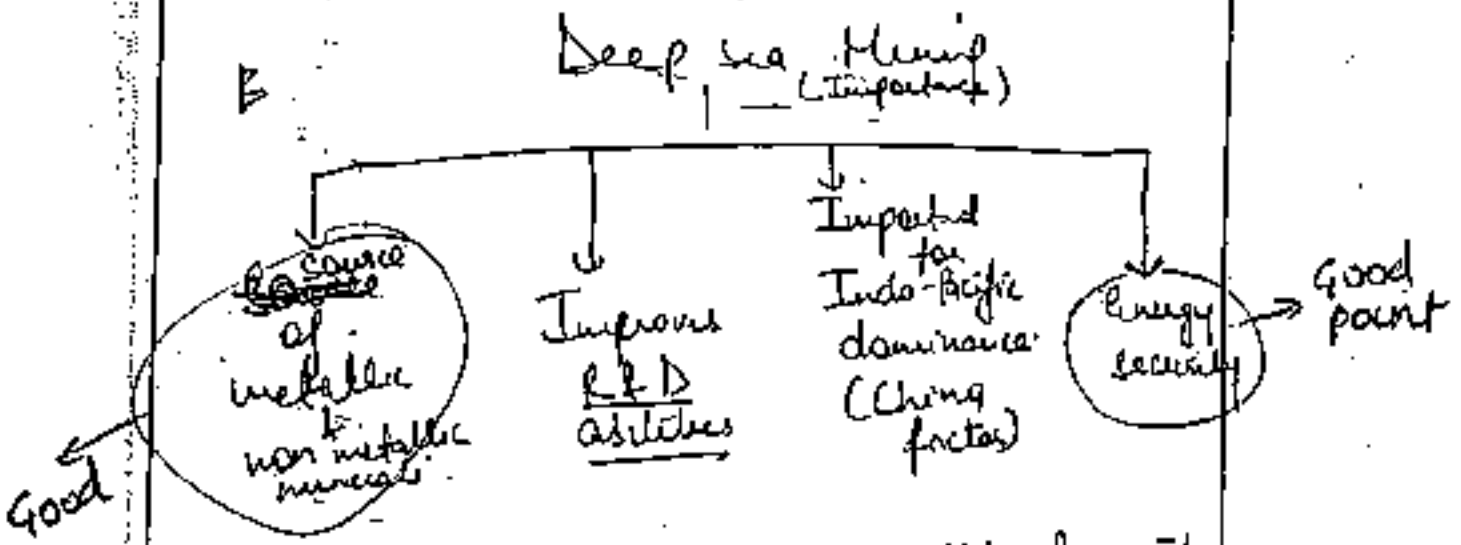
→ ~~disturbed~~ Hurts other exotic & endangered animals. eg: In Gulf of Mannar.

Against the principle of PEACEFUL & SUSTAINABLE

GS SCORE
GS MAINS TEST SERIES 2019

Deep Sea Mining

India recently obtained permission to extract Poly Metallic Nodules in Indian ocean from International Sea Bed Authority.



However it affect marine life & ecosystem by — i) Harming flora & fauna ii) Artificial vibrations earthquakes possibility
ii) Polluting the water

} Elaborate these points a little.

India must adopt a sustainable & eco-friendly approach for it's national interest as well as commitment to environment

} well concluded

Remarks

3 1/2

GS SCORE
GS MAINS TEST SERIES 2019

Q4. "Anthropogenic activities have been constantly threatening biodiversity of India's hotspots". Analyse the impact of human interference on flora and fauna of these biodiversity rich regions. Suggest some of the conservation strategy with existing framework citing Gadgil and Kasturirangan reports on Western Ghat. [10 Marks]

India is a part of the selected global biodiversity hotspots as it is blessed with favourable climate & diverse landforms & weather systems. — Decent intro

~~However~~ ANTHROPOGENIC activities have been observed lately in following the principles of SUSTAINABLE DEVELOPMENT especially in the fragile North East & Western Ghats. — Lapses

Need to analyze the impact of human interference

- Factors
  - Irresponsible Mining
  - Emissions..
  - Roads & other infra projects
  - Rampant Urbanization
  - Polluting factories
  - Overusage of fertilizers in agriculture

Remarks

Not to mention hunting & poaching have also continued to exist despite CITES

Kasturirangan & Gadgil Committee

The 2 successive committees painted a worrying picture of the biodiversity rich west ghats & recommended:

→ Environment Impact Assessments to be conducted before clearance

→ Special consideration to important National parks & Bio reserves like Shola forests & Nilgiri Reserves etc.

→ Buffer zones with no human activity

→ Eliminating coastal Encroachment

→ Following emission norms & strict enforcement by CPCB & MoEFCC

Need to mention important ones like
- Demarcation of sensitive zones
- Restriction of mining activities in western Ghats
- Shutting all thermal & hydro power plants from ECZ-I

Conclusion is missing

(1 1/2)

Could have mentioned what was missing in earlier Biofuel policy. eg Earlier only non food crops could be used as raw material

GS SCORE
GS MAINS TEST SERIES 2019

Q5. National policy on Biofuels primarily tries to address supply-side issues that has discouraged the production of biofuels within the country. In this regard, highlight the salient features of the policy and also mention the benefits of the policy. (10 Marks)

Decent intro but can be improved

India is a energy deficient country & is dependent on hydrocarbon exports from OPEC etc for ENERGY SECURITY

Irrelevant

Hydrocarbon fuels problems

- contribute to CAD (Avoid abbreviations)
- High emissions. (GHG contribution)
- prone to problems of geopolitical calculus. eg: Iran Blockade

National Biofuels policy

Biofuel policy envisages increasing the share of biofuel, biomass energy in the energy mix.

envisages -

Include important ones like
- expanding scope of raw material eg damaged food grains unfit for human consumption
- Allow use of surplus food grains for ethanol production

→ Increasing focus on Biomass, Bio CNG, ethanol & livestock residue etc based energy: eg: PM-JIVAN.

→ Incentivise masses to create WEALTH from WASTE (Gobar Dhan)

→ Provides avenues for R&D focus on the Biofuels based economy.

→ Substituting biomass burning like dung cakes in villages to Gobar gas.

→ Recycling used oils etc for CYCLICAL fuel usage focusing on bio fuel plants like JATROPHA

Good point

The policy will help by:-
- → Reducing hydrocarbon dependence
- → Creating wealth from waste (SWACHH BHARAT Linkage)
- → Increasing R&D.

- Reduce pollution
- Reduce current account deficit

However proper awareness & incentive structure & focus is needed for country wide

Improve

Conclusion

GS SCORE
GS MAINS TEST SERIES 2019

Q6. What do you understand by 5G technology? What are the advantages/applications and challenges to adapt to 5G in India? (10 Marks)

5G technology is a [continuation of] the 4G VOLTE technology which promises to revolutionalize the telecom sectors in particular & Information & Communication Technology in general. } Good start

Advantages

~~[illegible]~~

→ Low Latency (system) rate
→ High throughput is possible } Faster speeds
→ Wider spectrum (30GHz)s
→ Foundation for INDUSTRY 4.0 like Artificial Intelligence, DRIVERLESS CARS, Internet of Things etc. } Good part

Remarks

GS SCORE
GS MAINS TEST SERIES 2021

Challenges

Despite huge potential & a highly skilled ~~work~~ force in software sector India faces following problem:-

→ Spectrum tariff issue is causing delay.

→ Telecom companies are already saddled with loans & facing competition (JIO Revolution)

→ Dependence on imports for hardware (Huawei).

→ Digital illiteracy continues & newer technologies could accentuate technology gap.

5G has huge potential in Agriculture (Predictive analysis), Technology (Driverless car). It could solve major problem of the economy so steps for 5G must continue

High cost of infrastructure required for 5G technology

Also add: security and privacy issues

Good point

Good

Decent conclusion

Remarks

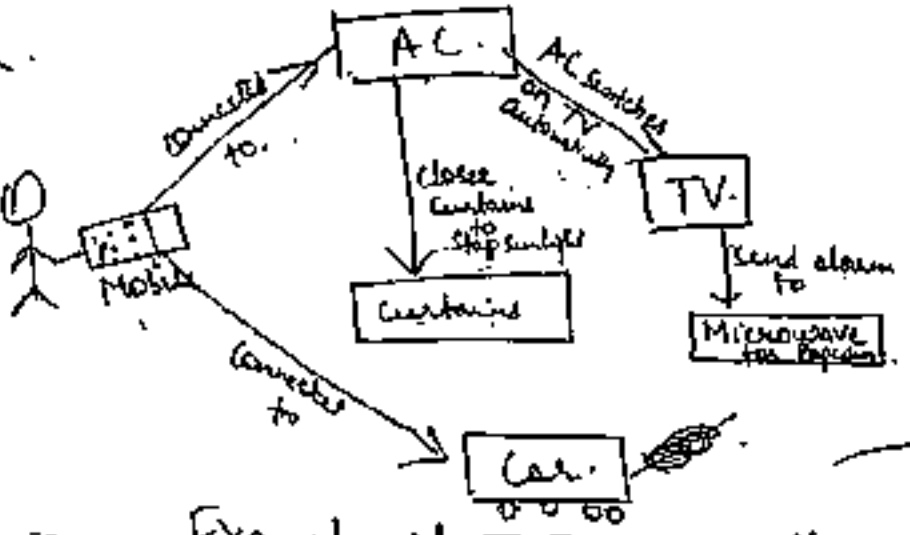
GS SCORE
GS AIMS TEST SERIES 2019

Q7. It is expected that there will be more than 24 billion IoT devices on Earth by 2020. What do you understand by 'Internet of Things' (IOT)? Who are the major stakeholders in it? How will it benefit different industries? Examine. (10 Marks)

IoT refers to an interconnected interface between various devices which would allow them to communicate & perform tasks in an integrated manner.

Good start

eg:



Example of IoT in a Home.

Stakeholders
- Government (seeks inclusive growth)
- Industry (seeks profits & return of investment)
- People (seek good, safe & secure & easy services)

Remarks

Can also add 3rd party application developers.

GS SCORE

Benefits to Industries

→ Agri Industry

→. Interconnected system for fertilizer sprays, water supply etc.

→. ~~Textile~~ Manufacturing

→ Automated & interconnected system across the value chain

→ Driverless car ✓

→ Telecom Industry

→ Spectrum gains

→ Subscription gain, high speed & economies of scale.

→. Service sector & IT -

→ Greater data availability for PREDICTIVE ANALYSIS & Data Mng.

Could have mentioned challenges in each industry as well

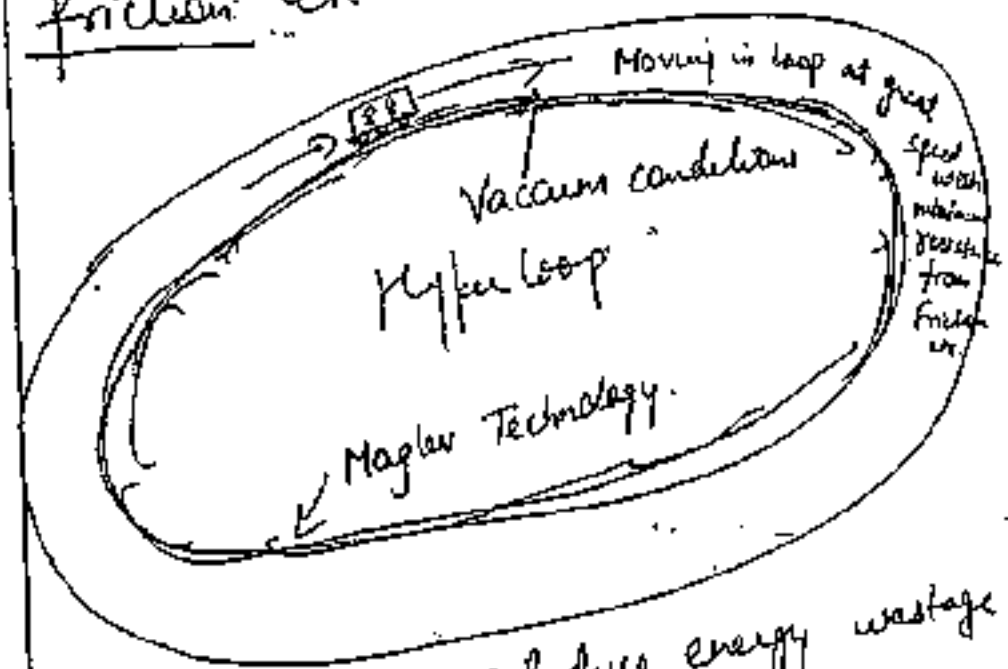
Remarks Conclusion missing

3 1/2

GS SCORE
GS MAINS TEST SERIES 2019

Q8. US-based Hyper-loop Transportation Technologies (HTT) is in talks with five Indian states to build a high-speed travel network. Highlight the technology behind hyperloop and discuss its significance for India. [10 Marks]

Hyperloops are based on the principles of allowing fast travel & by reducing energy losses due to friction etc.



Technology need to be explained in a better way

Principles used —
→ Reduce energy wastage due to friction
→ Magnetic Levitation
→ Vacuum to reduce air resistance

Remarks

GS SCORE
GS MAINS TEST SERIES 2019

Significance

→ Reduce time to travel significantly
→ Spur technological innovation ecosystem
→ Tackle the problem of traffic congestion which is an issue in Road & Rail based system
→ Ease of living & Ease of Business because of cutting Lanes
— Its a green mode of transport
— cheaper than high speed bullet trains

Good point

Conclusion is missing

2

Remarks

Q9. Owing to growing dependence on space resources, it is important for India to protect its critical space assets and infrastructure from possible threats. In this context, examine the need for a Space Security Policy in India. (10 Marks)

GS SCORE
GS MAINS TEST SERIES 2019

Decent Intro in context

US recently announced a Space force to safeguard it's space infrastructure & for space warfare potential in the future.

India's space assets

→ GSAT satellites (Communication)
→ Imaging satellites
→ Possible future space centres etc

The breakdown of space assets will hamper → Communication
→ Border security
→ Financial transaction
→ Navigation

Elaborate these

This part should be the main focus of the answer

Therefore, Space security policy can be

Also discuss about policies of some nations showing signs of weaponisation of outer space

We have to examine the need for Space security policy

Remarks

GS SCORE
GS MAINS TEST SERIES 2019

a possible game changer by -

→ Developing integrated policy for safeguarding space assets

→ Develop suitable Hedgings by collaborations with like minded countries like FRANCE, US or.

→ Can bring focus on international rules based treaty beyond the UN Outer space treaty.

→ Explore space force systems like US.

→ Develop anti Satellite Capabilities (ASAT missile test).

All this could be summarized in the concluding paragraph

India must engage with all stakeholders for developing strategies for peaceful use of outerspace.

Conclusion can be improved

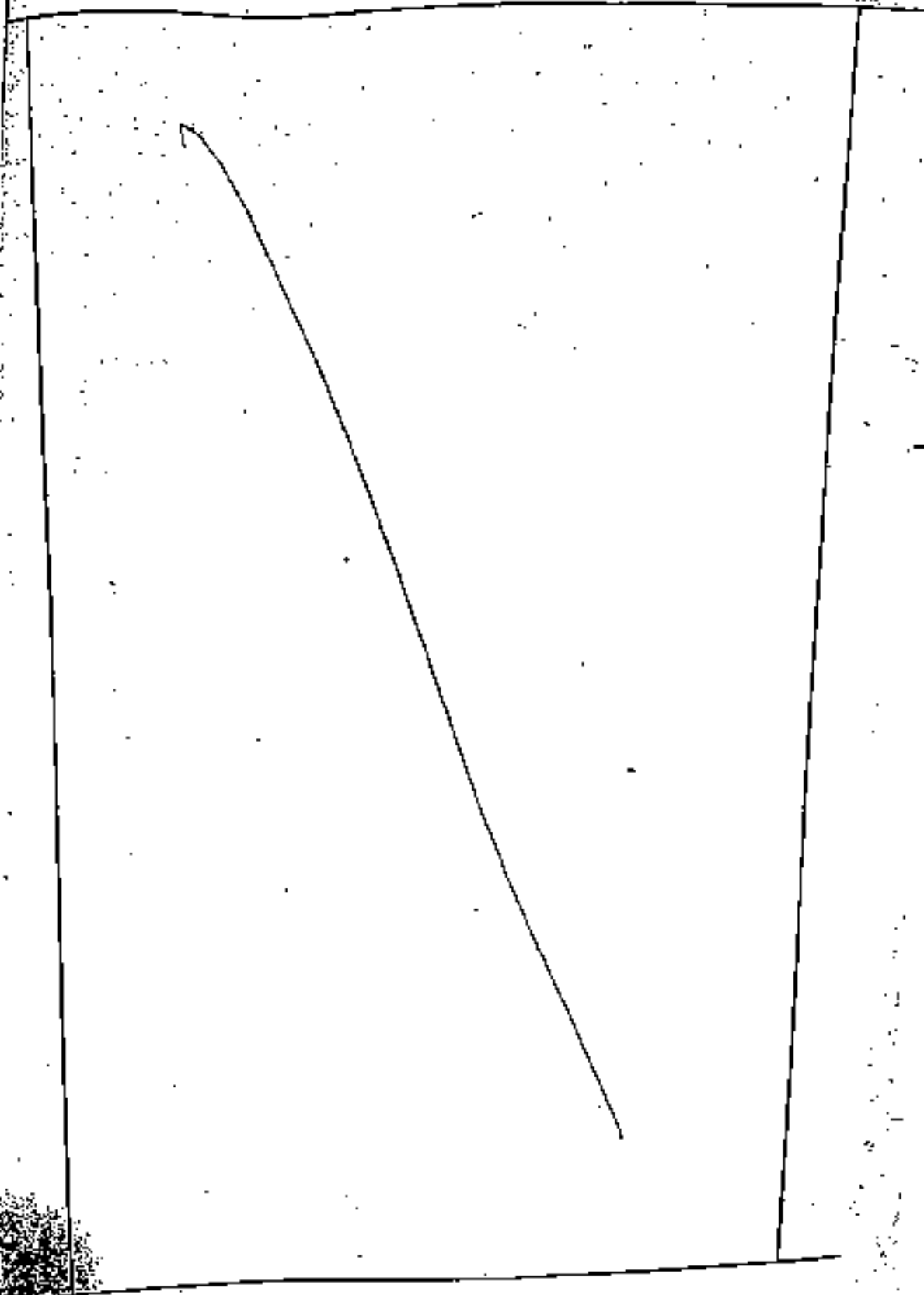
Remarks

1 1/2

Q18. Graphene was touted as "the next big thing". Many believe it could spell the end for silicon and change the future of computers and other devices forever. In this context, list out its potential applications. Discuss the challenges that are arising in the commercial use of Graphene.

(10 Marks)

Remarks



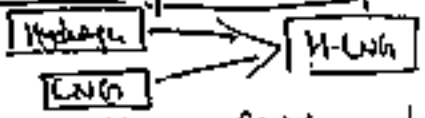
Remarks

Section - B

Q11. Environment Pollution Prevention and Control Authority (EPCA) recently recommended to the Supreme Court that Delhi's buses switch fully to CNG within the next two or three year. In this regard, what do you understand by Bio-CNG and H-CNG? What are the advantages of Using H-CNG Vehicles? Also highlight the challenges. (15 Marks)

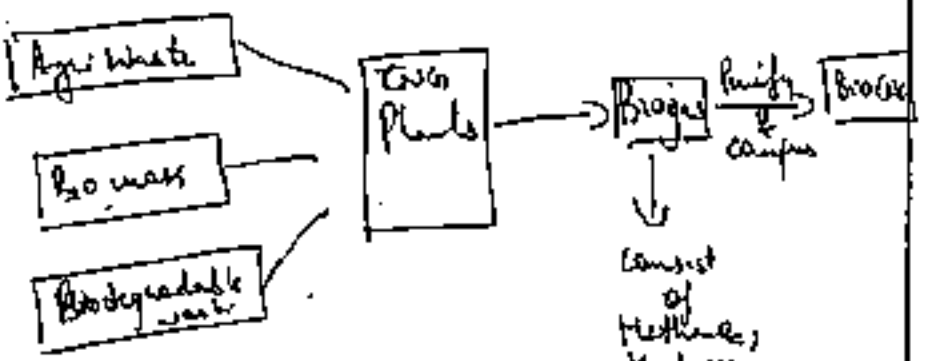
H-CNG refers to Hydrogen compressed Natural Gas & involves a mixture of Hydrogen & CNG in a fixed predefined ratio (8-40% usually). around 18%

Decent start



BioCNG is the CNG obtained from biological processing of the biomass & agri waste etc in a biogas plant.

The definition can be improved



Remarks

GS SCORE
GS MAINS TEST SERIES 2019

HCNG Advantages

- Low polluting than only CNG as end products are Water & CO_2. Therefore, lesser NO_x & SO_x & other GHGs.
- Higher Calorific value that conventional CNG.
- No new changes in engine required Slight modifications can bring optimal performance.
- Will contribute in making delhi cleaner & safer for living
- Step to comply with India's INDC under Paris Accord.
- HYDROGEN can be comparatively

Good points

Remarks

easily procured as opposed to importing CNG from middle east.

Challenges

- Stable supply for Hydrogen will need to be resolved.
- Hydrogen - CNG ratio determining required more R&D.
- HCNG is comparatively costlier.
- Adoption on a higher scale will require awareness campaign.
- Bureaucratic inertia & reluctance of Gas distribution companies due to increased costs.

Good points

HCNG is a step in right direction. However, steps must be taken to implement it SUSTAINABLY.

Decent Conclusion

Remarks

GS SCORE
GS MAINS TEST SERIES 2022

Q12. Over-exploitation and loss of habitat is leading to the extinction of various plants, animals and microbial species. How is the Indian government attempting to tackle the issue? (15 Marks)

Good start

Rapid urbanization & globalization coupled with increasing population is causing the problem of over-exploitation of resources.

UNCCD says land degradation has increased to unprecedented level.

Climate Change, land degradation & encroachment is causing worries of SIXTH MASS EXTINCTION.

EXTINCTIONS

~~Reduce Biodiversity~~ Extinction leads to:

→ Affects food chain

→ Biodiversity shrinks

⇒ Reduces resilience of ecosystem

Remarks:

Government Steps

GS SCORE

→ COP 14 ~~negotiation~~ of UNCCD & adoption of LAND DEGRADATION NEUTRALITY approach by.

- Afforestation
- Smart Agriculture
- Reducing cattle pasturing
- Increase floor-space index of buildings to reduce land encroachment

Good point

→ MoEFCC [GoI] envisages to develop strategy for coexistence with wildlife by.

- Animal corridor
- Environment impact assessment
- National Parks & Wildlife Sanctuaries
- Tiger Parks under Project Tiger

Human-Biogenome project & others.

How this project is protecting plants, animals, microbial

Remarks

initiatives are taken to map genomes & preserve diversity.

→ ~~Seed~~ Plant banks to conserve exotic species eg Botanical Gardens.

→ Developing stringent norms for pollution control
- CPCB initiatives
- National Action Plan on Climate Change's subparts like Himalayan mission etc

→ Legal mechanism like
- National Biodiversity Act, 2002
- Wildlife Act.
- Water Act
- Air Act
- Environment Act etc.

A community based planning is the key to solve regional problems as well as protect flora & fauna.

Can also mention bodies like wildlife crime control Bureau

Can also mention seed bank estb. in Ladakh regio

Conclusion can be improved

Remarks

6

GS SCORE
GS MAINS TEST SERIES 2019

Q13. The main factors contributing to urban air quality deterioration are growing industrialization and increasing vehicular pollution. Discuss the recent policy initiatives taken by the government in mitigating air pollution. (15 Marks)

India has the unfortunate distinction of having 14 of the 15 most polluted cities according to a recent WHO Report

Good intro

Air pollution factors
- Industrialization
- Vehicular pollution
- Biomass & stubble burning
- North India's bad geography (Mountains etc) block air.
- Natural factors like Forest fires, volcanoes etc

Should have highlighted the link between growing industrialization and increase vehicle with bad air quality

Recent Steps

→ National Clean Air policy of ~~National~~ Clean air & ecosystem in the country.

Remarks

INDUSTRIAL & Vehicular →

→ National Clean Air Policy → Elaborate could have mentioned some important provisions

→ National Action plan on Air pollution recently unveiled by CPCB ~~proposes~~ envisages reducing PM2.5 & PM10 reduction in 102 cities → Good points

→ FAME II scheme for faster adoption of Electric vehicles to reduce air pollution

→ Introduction of NCNG to reduce NOx & SOx emission → could have also added Graded Response Action Plan by CPCB in Delhi & NCR.

→ Enforcement of CPCB norms on industries & oil refineries
- Electrostatic Precipitators
- Air purifiers etc.

Remarks

GS SCORE
GS MAINS TEST SERIES 2019

→ Adoption of BS VI fuel (equivalent to Euro 6 norms) in the entire country by 2020. Good

→ Incentivising WEALTH from WASTE by promoting biomass / agri left over processing instead of burning

→ Catalytic converters norms in vehicles are being imposed.

→ Data driven decision making by Air quality monitoring for PM 2.5, PM 10 & NOx, SOx etc eg Air Quality Index

→ Air Act, 1981 penalties are being enforced.

→ Focus on Renewable energies & gas based economy.

→ International Solar Alliance for cooperation

Remarks

(5½)

can also add :- Ban on pet coke in Delhi

Conclusion is missing

GS SCORE
GS MAINS TEST SERIES 2019

Q14. The Environment (Protection) Act was enacted in 1986 with the objective of providing for the protection and improvement of the environment. To what extent, the act has been able to live up to its mandate?
[15 Marks]

Environment Act, 1986 was a follow up to the environment movement in India which started with Wildlife Act, 1972, Air Act 1981 & Water Act 1974

- Safeguard environmental resources
- Spur environmental awareness & consciousness
- Complement Air & water Act } Good point
- Uphold principles of Stockholm Conference, 1972 & Nairobi Conference, 1982
- Safeguard environmental biodiversity (complements biodiversity Act, 2002)

Could give some concrete features of Environment Protection Act.

Environment Act, 1986 salient

eg Provision for response in case of accidental discharge of any pollutant

Jurisdiction of civil courts barred under the Act

Remarks

GS SCORE
GS MAINS TEST SERIES 2019

Living to the Mandate

~~Three Part~~

→ Increased Awareness among many

→ Made Industry responsible to an extent.

→ Spurred environmental consciousness

→ Led to ~~legislation~~ judgements like MC Mehta case where right to clean environment was upheld under Article 21.

→ Built institutional & administrative framework for monitoring environment

Good point

Also mentio successful network of govt. offic both at state and national level

Lacking:

→ However, Industry compliance has been unsatisfactory.

→ Farmer awareness has been low.

Remarks

→ Can also add mismanagement of funds.

→ Lack of cheaper technology led to low results on ground.

→ Bureaucracy was rather lax in ~~corrupt~~ enforcement.

→ Lack of political will

However, recently MoEFCC & civil society have stepped up & are spearheading environment consciousness & awareness. In fact, India is emerging a leader in green proliferation & renewable energy.

Decent conclusion

GS SCORE
GS MAINS TEST SERIES 2019

Q15. "Nearly 30% perennial springs in the Himalayan region have dried up causing water scarcity in the Himalayan region". Discuss the issue in light of Shimla water Crisis and suggest the need to implement structural and non-structural solution. (15 Marks)

Himalayan regions have witnessed a huge growth in ~~the~~ population & tourism. Further, urbanization & global stresses like climate change have only accentuated the problem.

→ Decent Intro but can be improved

→ Should have discussed here the causes for drying of springs.

Structural Solutions

→ Agro climatic based agriculture development - eg: Stop rice cultivation in these areas.

→ Rejan Easement Act, 1882 which gives ground water rights to the owner.

→ we have to discuss the need to implement structural and nonstructural solutions

→ Develop policy framework to rationalize irrigation. &

→ Industry & complain to CPCB norms:

→ Following the National Action Plan of Climate Change guidelines

→ WATER TARIFFS

→ Afforestation initiatives to increase water & absorption.

→ Rainwater Harvesting

NON STRUCTURAL

→ Fresh water transportation framework & infrastructure from water surplus region.

→ Ground water train Storage tanks

Relate this with need to implement structural solutions

→ Water meters to monitor usage.

→ Awareness campaigns for water rationalization.

→ Water conservation techniques like drip irrigation etc

→ Water recycling & reuse.
eg: Used water in washrooms for flushing etc.

Relate with need to implement measures in solutions

(4)

Water is fundamental to life & integrated steps are needed for. Water Scarcity problems in a high population density country like ours

Decent conclusion

Q16. What do you understand by geoengineering? Examine why North Eastern Monsoon brings less rainfall far below its actual potential and also critically discuss how geo-engineering can solve the problem. (15 Marks)

GS SCORE
GS MAINS TEST SERIES 2019

Geo engineering refers to tuning & influencing geological & geographical factors to bring about a change ~~in the geological phenomenon~~ offsetting the effects of the geographical phenomenon → climate change

Here should have mentioned some Geo-engineering techniques

Northeast Monsoon

~~The oasis from~~ Unlike South west monsoon which brings moisture laden air from the Indian ocean & Arabian sea region to the Indian subcontinent, Northeast

Remarks

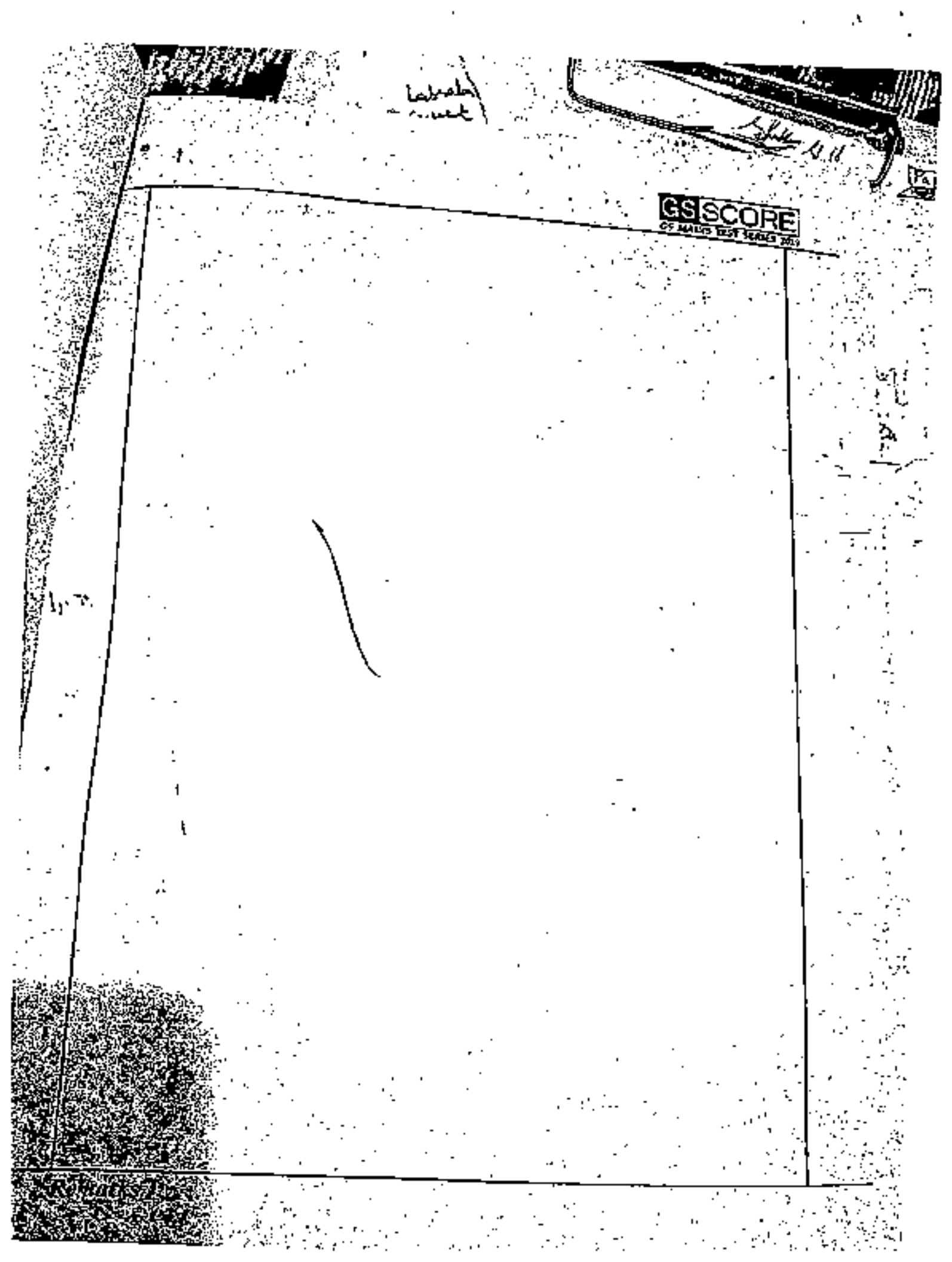
Monsoon brings rainfall air from the land mass area of the Asian subcontinent to the Indian ocean. Since, these winds come from the landmass they have lesser moisture & therefore lesser rainfall.

(2)

More reasons why NE Monsoon brings less rainfall than its actual potential

- low pressure area not formed in Andaman sea
- Because of the impact of western disturbances in NW India
- Higher temp. on land

Discuss critically how geoengineering can solve this problem


GS SCORE

Q17. Unregulated growth of urban areas without necessary infra-structural services and proper collection, transportation, treatment and disposal of solid wastes has resulted in increased pollution and health hazard from these wastes. Assess Swachh Bharat mission's efficacy on the matter. (15 Marks)

Intro needs to be improved

Despite Solid Waste Managment Rules, 2016 by the Hon'ble Supreme court, the waste generation & collection infrastructure remains weak. Other rules like Plastic Waste, E-waste Rules are also being flouted.

Need to relate how unregulated growth of urban areas without necessary infrastructure is resulting in pollution and health hazard.

SWACHH BHARAT - Swachh Bharat is flagship program of GoI to focus on cleanliness, sanitation & making India Open defecation free.

It has led to :

→ Behavioral changes in the masses.

→ JAN ANDOLAN in rural & Urban areas

→ Focus on waste disposals & toilets.

→ Emphasis on Wealth from Waste (Gobar Dhan etc).

This has helped in :

- Creating awareness.
- Bring bureaucratic focus on issue of solid waste
- Focus on infrastructural arrangements for waste disposal & treatments

Focus should be more on disposal of solid waste

Need to relate to the demand of the question

Assess efficacy of SBM on the issue of infrastructure services and proper collection, treatment and disposal of solid waste

Flawed issues remain like -

→ Lack of funds with local bodies

→ Demotivated municipal workers & waste pickers ✓

→ Poor understanding of people on segregation of waste ✓

Urban areas need a focused & integrated waste management system integrated with waste reuse, waste recyclability & waste to energy treatment facilities.

Decent conclusion

GS SCORE

Q15. What is e-waste? A United Nations-affiliated group estimates that e-waste is growing faster than almost any other waste type. Examine how India can effectively manage its e-waste. Also briefly discuss the fresh rules that India recently brought in to govern the handling of electronic waste. (15 Marks)

E waste refers to electronic waste generated from left over of useless electronic appliances like TVs, fridges, computers etc

e-waste definition can be improved

E-Wastes issues in India

- Harmful chemicals like cadmium, Mercury etc
- Difficult to dispose in landfills etc.
- India is a dumping ground for e-waste

Managing e-waste

→ Creating awareness among masses
→ Controlling e-waste dumping in India.
→ Responsibility & accountability setting on the producer.
→ Focusing on reusing & recycling of waste.
→ Encouraging harmless chemical & plastics to avoid land & other degradation.

Also discuss establishing e-waste collection centers.

Remediation techniques can be used to decompose waste.

Learn best practices from Japan Israel in waste management

E-Waste rules were unveiled recently & provide for:

→ Reusing & recyclability of the waste wherever possible
→ Controlling waste dumping.

Also discuss the Deposit Refund Scheme

GS SCORE
GS MAINS TEST SERIES 2019

→ Producer's extended responsibility for the generated waste

→ Awareness among the users on disposal.

Good point

Basel convention on Transboundary Movement of Hazardous waste must include e-waste to highlight the scale of problem.

Continue can be improved

5½

GS SCORE
GS MAINS TEST SERIES 2019

Q19. With the view of Regulating the use of drones in India, Ministry of Civil Aviation recently announced guidelines on drones that will come into effect from 1 December 2018. In this regard, mention the key features of the "Drone Regulation 1.0". Also highlight the various non-military applications of drones. (15 Marks)

Drones & drones are estimated to be a 100 Billion $ industry in India by 2025 according to a Deloitte report.

} Intro in context

Since, Drones were unregulated the DGCA (Directorate general of civil aviation) came up with Drone Regulation.

→ Define drone as a manned flying object in the sky within set limit of weight & altitude.

→ Guidelines for line of sight drones usage

→ Compulsory registration of drones (Unique Identification number)

Also discuss about Digital sky platform

→ Remarks

→ Compulsory training for operating drones in sensitive area

→ Restricting drones near Airports, ~~near~~ near sovereign waters etc

→ Classifying drones into micro, mini, nano etc. Categories.

Drones Usage

→ Agricultural mapping of crops, pesticide delivery etc

→ Industry usage :-
- Amazon's drone based delivery system
- Industrial oversight
- Remote monitoring & assessment in areas dangerous for human
eg: Inside Mines, over mountains etc.

Can also mention role of drones in rescue & search operation

+

Role of drones in wildlife conservation

Remarks

Can also mention role of drones in traffic management

GS SCORE
GS MAINS TEST SERIES 2019

⇒ Commercial purposes

→ Manage function for photography, videos etc.
→ Home monitoring
→ Service delivery.

⇒ Entertainment industry for.

→ Camera angle shots from heights in Movies.
→ Games for kids entertainment

Can also mention role of drones in urban planning

Drones usage ~~is~~ therefore not only helps in military (Rustom, Dhruva etc) but also has potential in non military purposes.

Decent conclusion

6

Q20. What is Robotics? Highlight its applications in Automobile, Military applications, Health & Medicine, Agriculture, Space Exploration and Banking sector. Also mention the objectives of Robotics society of India. (15 Marks)

Robotics refers to leveraging robotics technology. Robotics involves building automated machines built on computer coded algorithms. ~~"coded"~~ ~~of or Chips~~ These algorithms are coded on chips & installed in machines to build Robots.

Definition of robotics need to be broadened

Uses

Automobile → Manufacturing of cars (Automation)

→ Driverless cars (using Pre coded robots)

Military Application → Command, Control, Communication Computer, Intelligence, Surveillance & Reconnaissance (C4ISR)

→ Military warfare technology

→ Diffuse bombs

→ Navigate difficult terrains

Remarks

GS SCORE

Health & Medicine

- Tele-Medicine using Robotics
- Robotic arm Surgery
- Precision operations like LASIK etc
- Diagnostic tests
- Prosthetic limbs

Agriculture

- Robotic drones for land mapping & surveillance
- Fertilizer & pesticide delivery
- Harvesting, sowing etc using robotic arm

Good points

Space Exploration

- PRAGYAN Rover in Chandrayaan II
- Taking missions where involving human is risky
- Doing complex calculations

Banking

- 24x7 service at bank counters
- Error free services
- Complex calculation in for eg: BLOCKCHAIN

Explain

Remarks

Robotics Society

→ Encourage the R&D infrastructure in robotics

→ Collaborations (intra & inter country) for state of art work.

~~→ for Industry interactor work~~

→ University - Industry Interaction for society relevant research.

→ Enforcing & monitoring robotic ETHICS in the ecosystem } Good point-

→ Articulating the concern of the robotic development society to government

Robotics can be a game changer & must be nurtured in the country. } conclusion can be improved

Remark

16