GS SCORE

IAS MAINS 2019

SCIENCE & TECHNOLOGY AND ENVIRONMENT

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

Q.	Marks
1.	4
2.	4.5
3.	4.5
4.	3.5
5.	4.5
6.	4.5
7.	4.5
8.	4.5
9.	4
10.	—
11.	7
12.	7
13.	6.5
14.	—
15.	5.5
16.	5.5
17.	6
18.	6
19.	6.5
20.	6.5

Total : 92 1/2

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.

1. Invigilator Signature _____

2. Invigilator Signature _____

Name Jatin Kishore

Roll No. [redacted] 18584

Mobile No. _____

Date _____

Signature Jatin

REMARKS

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)

Bay of Bengal large marine Ecosystem project [BOBLME] is multilateral regional collaboration for sustainable development of Marine resources and human welfare among Bay of Bengal Region. BOBLME involve countries like India, Myanmar, Bangladesh, Srilanka, Thailand, Malaysia, Indonesia, Maldives

Major initiatives are:-

- It aim to improve life of people. Around 400 million people dependent on Bay of Bengal region with promoting sustainable fishing and pisiculture. Also it aim to reduce marine pollution.
- It aim to conserve ecology of Bay of Bengal region which host 8% of all mangrove & 12% of all coral.
- It conserve bay, spits and other depositional landform.

Apt introductio

Discuss key initiative like ↓ Protecting Coastal Communit Conducted study on BoBLME environment

⑥ It fosters transboundary cooperation among nation. sidelining their issue like Palk strait b/w India and Srilanka, Myanmar Thailand border etc.

However some challenges of BOBLME are:

make it concise

① Lack of fund for regeneration & conservation

② capacity building measure and Technological upgradation among fisheries sector.

③ limited to regional level as more Global convergencies emerge like climate change it require Global collaboration.

Discuss its effectiveness

Hence considering the large amount of biodiversity in Asia-pacific region and large dependent population, more collaborative and comprehensive measure are require to fulfill SDGs & sustainable development.

(11)

Remarks

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

Black carbon is a short term pollutant which have large green house gas potential compare to carbon dioxide.

Discuss the geographical region from where these Carbons are emanating

According to IPCC Hindu Kush Assesment Report, Hindu Kush mountain which are regarded as III rd pole of Earth due to massive Glacier, have receded more than average speed around 1/3rd Glacier retreat by 2100.

Among various reason like increase Green house gases, Our Exploitation by human, Deforestation etc., Black carbon has significant contribution

nicely explained

① Black carbon generated by unburnt hydro-carbon & Bio fossil fuel burning have greater GHG potential resulting greater warming.

② Black carbon which get settled on Ice caps decrease its Albedo which fuels cyclic process of melting.

Remarks

- Black carbon help in formation of Brown cloud which act as a insulator further increasing warming.

Receding Himalaya can have disastrous effect on entire subcontinent region. Some step such as :-

- Reducing green house gases and Black carbon through improving technological intervention like BS VI norm, filters in Thermal Power plant etc.
- Afforestation, counting Desertification & land degradation, sustainable development specially in Himalayan Region
- Bio-Engineering proces to mitigate Himalaya region from climate change.

Hence, Both Structural & non structural step need to be taken to mitigate Ecological Services Himalaya.

(3½)

Shorten it and discuss relevance of himalaya glacier & the Impact of receding of glacier on Indian Sub-Continent

Remarks

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)

Explain bottom trawling & deep sea Mining

Srilanka and coastal India region are largely dependent on fishing for food and economic security.

However overexploitation of fishery led to the degradation of marine ecosystem.

Mineral

Practice of bottom trawling & deep sea mining led have various negative consequence like:

Discuss India's & Srilanka's stand on it.

- Dredging of sea floor can disturb Benthic marine organism and can also disturb offspring of various organism.
- bottom trawling have resulting in capture of unwanted species and like Duyong, shark etc. resulting endangering their status.
- Deep sea Mining can alter the chemical and physical state of marine ecology like temperature, salinity etc. which may

nicely explained

Remarks

have adversely affected marine organism.

(5) Also Deep sea mining can induce seismic activity and may led to release of methane Gas in atmosphere leading to increase GHG.

Good points

(1) Bottom trawling can introduce invasive species which can change local ecosystem.

Further Since India fishery mainly dominated by inland fishery & only 35% are coming from marine fishes India need to increase it resource from marine. Also ISA permission to India to explore poly metalic nodule will further increase mining operation; therefore such practice need to sustainable & non environment degrading for sustainable development. Measure like hydraulic scoop for mining, technological upgradation of fishing boats, training & capacity building of fishermen need to be focus.

Needs attention

4½

Way forward ?

Shailesh Nayak Committee's recommendation

Remarks

Q4. "Anthropogenic activities have been constantly threatening biodiversity of India's hotspots". Analyze 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 one of most diverse 17 nation in the world hosting 7-8 % of all species. According to International conservation, India home to 4 hotspot namely, Indo-Burma, western Ghat and eastern Himalaya and Sundaland.

Good Introduction

Over the year the health of Hotspot get deteriorating due to Anthropogenic activities like

(1) Expansion of agriculture land through cutting down forest. Schedule V and VI provide greater autonomy also fuel shifting cultivation specially North East region.

(2) Unsustainable agriculture practice leading to reduce water table. Eg: In Konkan with upper course, cultivation of sugarcane lead to lower water table,

(3) Mining activity in North East and Western Ghat leading to degradation of ecology.

Shorten it and discuss the threat associate with each hotSpot

Remarks

① Over exploitation of resource like fishing reduces sustainability of ecosystem.

② Anthropogenic activity induced climate change because of increase GHG lead to shifting of weather phenomena & rainfall pattern.

According to constitute Kasturirangan & Gadgil committee setup to look degradation of hotspot western Ghat.

Gadgil & Kasturirangan committee recommend complete ban on developmental activity in Eco-sensitive zone. However Gadgil committee demarcate Eco sensitive zone into Eco sensitive I, II, III, IV zone. to regulate development and mining activities. They also regulate tourist inflow, Hotel facility and other function in Eco sensitive zone.

not appropriate

(3½)

→ Highlight the precise recommendation of Gadgil & Kasturirangan report.

— Mining activities to be restricted in Western Ghats

Remarks

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)

Biofuel are the renewable fuel derived from Biomass. They can categorize as 1st Generation which obtain from food crop, 2nd Generation obtained from residual agri waste 3rd Generation obtained from Algae. Good

National policy on Biofuel 2018 focuses on production of Biofuel as

① It expand the scope of raw material to include residual food crop broken rice, wheat etc.

② It provide viability Gap funding for developing infrastructure.

③ It promote OMC's to create market for Biofuel. ↳ Avoid shortforms

④ It also crown 20% ethanol blending & 5% bio diesel.

nicely explained

some of the Benefit of Policy are :-

Remarks

Good intent with good structuring

- Biofuel can reduce GHG emission & reduce SO_x emission by 99%.
- It can reduce import dependency on oil and gas and further improve current account deficit.
- It can reduce cost of fuel specially aviation turbine fuel and hence ~~reduce~~ reduce subsidy burden.
- It can propell Rural Infrastructure, support scheme like waste to wealth, Doubling farmer Income, Swatch India, waste management etc
- Improve Health by ~~dutton~~ channelizing used cooking oil.

Hence, National policy of Biofuel aim to create sustain supply side with adequate market mechanism & Demand.

(4½)

Remarks

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

5G is a new mobile technology associated with increase Data speed upto 20 MB/ps at peak hour and greater Reliability of connection. India have planning to roll out 5G service by 2022.

Substantiate by citing: Latency, massive device connectivity & Comparison with the earlier version

Advantages

① Greater speed & Data transmission along with high frequency & Bandwidth.

② 5G can include more new connection per 1000 sq km.

③ Very low latency time around 1 millisecond.

④ more reliable network coverage & less drop calls.

Good Analysis

Application

① New Emerging technology like Internet of things.

② Tele-education, Tele medicine and other e-government services.

③ Boost to Data mining, ~~Data~~ Big Data Analyses.

④ Promote Data driven startup.

Remarks

However there are some challenges in expanding 5G network.

Relevant Points

① High Spectrum price leading to increase cost of service and affecting it reach.

② skilled manpower involving in 5G.

③ Backhaul challenge as 20% operator are ~~linked~~ connected to optical fiber rest on microwave backhaul.

④ Urban - Rural divide manifested in telecom density in urban is 150% while rural is 70%.

(4½) ⑤ Illiteracy among people /. Explain your point

However it is estimated that timely rollout of 5G can give $1 trillion advantage to economy. Hence govt should have comprehensive & multi dimension policy to promote & facilitate 5G service in India.

Remarks

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)

Internet of Thing is emerging field in science which aim to integrate physical infrastructure with digital space. It allow inter device / inter machine and inter machine communication.

↳ Cite e.g. relating its working.

Major stakeholder involve in Internet of thing are

1. consumer
2. Service provider including internet provided manufacture of smart devices.
3. Industries also incorporate IOT in business process.
4. Government for Regulation & facilitation.

Relevant points

IOT said to benefit different industry like :-

1. Agriculture :- IOT can anchor smart irrigation system, smart pest control, monitor fertilizer supply, ~~[illegible]~~
2. Mining :- IOT can help in drill according to precise data and location.

Remarks

Good Points

Transport & logistics : Smart Traffic control monitor inventories loading and unloading in factories, smart warehousing, storing etc + facilitate Driverless Mobility including car, Trucks etc.

Industry : Automated supply chain in manufacturing, smart meter in power supply.

Public policy : Resource management weather prediction.

Household : Smart home, smart lighting, smart AC, Washingmachine.

(4½) However while carrying out IoT will face certain challenge like low Internet penetration & interoperability, Data privacy & cost of service.

Hence GOI must ensure timely adoption of futuristic technology through comprehensive policy & Regulation framework.

Remarks

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)

Hyper loop is a ~~travel~~ ~~by~~ high speed travel network develop by Elon Musk. It is estimated that it ~~can~~ @ 40 min for km almost halved compared to bullet train.

Discuss about the Indian states involved

It work on the technology of magnetic levitation. In hyper loop transportation technology it move in vacuum tube with minimum friction achieving the speed akin of the aircraft.

Elaborate its working ↓ series of tube, pod may travel fee of air resistan

Such HTT has great significance in India because

① It provide fast transportation

② cost is half of that bullet train which ~~eg~~ make it more attractive mode of transport.

Explain by Comparing other mode of transpo

③ It can supplement other public transport like bus, train, Airplane etc.

Good points

Remarks

② HTT is safe to operate in eqn. earthquake quake prone region hence ideal to use in seismic zone region.

Explain your point ③ ← Energy efficient mode of transport.

④ Help in decongest road & urban area by making commutation fast & cheaper.

⑤ Though HTT is cheaper than that of outlet main it is still an expensive than other mode of transport Hence, it commercial viability need to be further understand. Also HTT route & roll out plan need to incorporate with last mile connectivity.

Nicely explained

4½ Hence, GOI must carry out by comprehensive policy & regulation to settle rollout of technology. &,

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)

Space is a Global common and are used extensively by nation for social, economic and strategic purposes. Space provide resources like different orbit for satellite operation, outer planet metallic resources etc

Owing to growing dependence of space resource, India need to protect it critical space asset & infrastructure.

The our dependence is shown in different area like :-

1. Remote sensing & Imaging satellite
2. Banking & financial service & communication setup.
3. Military satellite
4. Inter planetary probe mission

Relevant Point

Explain each point relating it with Space technology

Threat emerging in are -

1. Anti satellite attack by any other nation
2. Attack on communication satellite affecting military, economic, financial sectors

Remarks

Good Points

(1) attack from outspace debris, Around 20000 large size debris present in ~~outer~~ space.

(2) Solar flare & other natural phenomenon

(3) Militarization of space - Access to over 300 military satellite present in space.

Hence it is imperative for India to come up with space security policy (like of US, china.

Space security policy should be comprehensive in dealing all space relate asset and services along with including space in military doctrine which include land, air, water & space warfare.

(4)

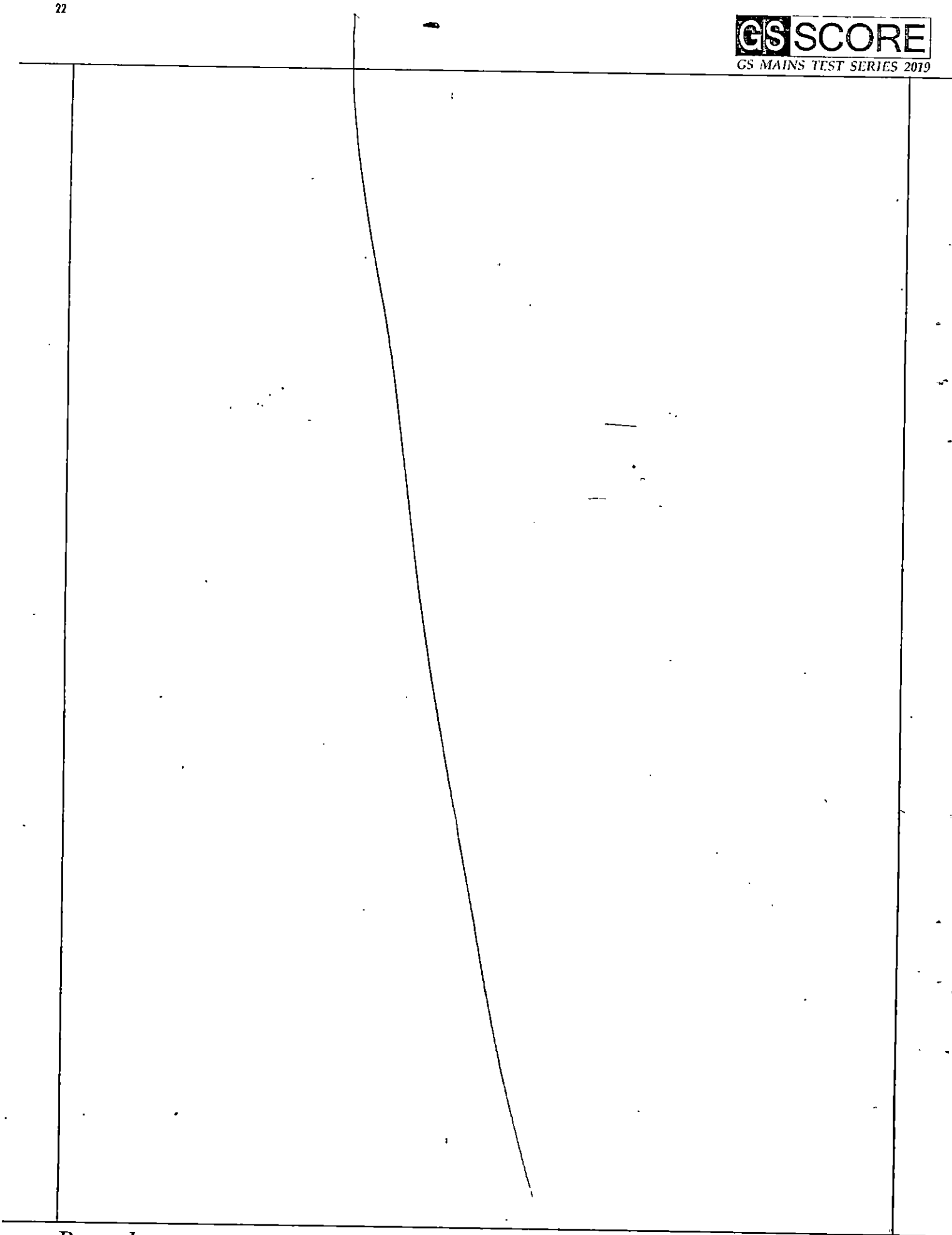
→ Illustrate some features that should be part of India's Space policy.

- Developing a legal architecture
- Developing Counter Space Capabilities

Remarks

Q10. 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 to H-CNG within the next two or three year. In this regard, what do you understand by Bio-CNG and HCNG? What are the advantages of Using H-CNG Vehicles? Also highlight the challenges. (15 Marks)

CNG is compreped natural Gas obtained from fossil fuel. It comprises primarily of methane gas around 97%. Bio-CNG is similar to CNG in composition around 95% pure methane. It is obtained from renewable source from agriculture and food waste.

HCNG is incorporation of hydrogen in CNG gas to increase H/C ratio in fuel and reduce GHG's. Accordingly CNG is blended by hydrogen to around 18%.

Good introduction

Hydrogen Concentration of 18%

Benefits

1. It can reduce emision of carbon monoxide by 70%.
2. It improve fuel efficiency in burning by improving H/C ratio of fuel.
3. Little modification is required to make engine compatible to HCNG.

7

Add more points

Remarks

① HCNG reduces unburned Hydro carbon reducing NOx emission.

Challenges.

(1) Blending of Hydrogen reduces energy content per volume of fuel.

(2) Expansion of HCNG vehicle without improving supply chain and infrastructure will be restricted.

(3) Research required to find optimum level of hydrogen blending to CNG.

(4) Small and medium vehicle may not be compatible for HCNG due to volatile nature of hydrogen.

(5) Blending of Hydrogen in CNG can increase cost of fuel making public transportation costlier.

Relevant points ↓ good ende

Remarks

Considering the challenges CPCA recommend use of HCNG limited to Delhi - buses. Hence to expand use of H-CNG to other mode of transport more Research and development need to be done. further Engine should be made compatible for efficient performance, infrastructure related to H-CNG pump need to be created for better transmission towards H-CNG fuel.

Way forward:- HCNG has potential to meet toughest diesel engine EURO-V norms.

Remarks

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)

Relevant points

According to the UNDP, India is one of the 17 most diverse countries in the world. With only 2.4 % of total land, India host 7-8 % of recorded species.

Every species of plant, animal and microbial species have it own niche in ecosystem and perform different ecological function in ecosystem. These are necessary for healthy ~~eco~~ and sustainable ecosystem.

Illustrate the reason behind poaching, over exploitation and habitat loss ↓ ever growing tendency of Profit making industry leading to mass extinction

Among the various threat like climate change, disaster; overexploitation and loss of habitat remain the most important threat.

overExploitation and loss of habitat lead to reduction of food, prey for carnivorous, reduce breeding tendency among animal, loss of keystone species leading to mass extinction.

Remarks

It also increase wild and human conflict leading to death, poaching.

To conserve diverse species government of India took following step.

① legislative measure like Biodiversity act 1988 wildlife protection Act 1972, forest act etc.

② ~~Project~~ Dedicated project like project Tiger, project Elephant, vulture conservation programe etc.

③ To control poaching and illegal trade empowering wildlife crime control Bureau

④ NGO's like wildlife trust of India, world wildlife fund etc.

⑤ Community participation like scared Groove, forest Right act etc.

Briefly analysed

Remarks

① Coastal Regulation Zones, Eco-sensitive zone, Tiger Reserve, forest Reserve to safeguard and conserve wildlife.

② Environment impact Assesment to asses developmental project impact on ~~the~~ & environment.

Hence to fulfill SDG and to mitigate climate change, conservation and safeguarding of Biodiversity is neccesary.

2

Remarks

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)

WHO releases 15 most Air polluted cities out of which 13 cities are Indian. India account for 30% of global premature death due to air pollution.

One of the main reason are growing Industrialization and vehicular pollution. Industries in cities mainly run through Thermal power plant which are the main source of sulphur dioxide and release of GHG.

- Construction industries are responsible for increase of dust particle and increase of PM 2.5 and PM 10 particles.

Relevant Point

Cite other e.g. of Industries contributing to air pollution

Similarly vehicular pollution releases carbon monoxide, and other green house gases due to unburnt combustions. major cities in India are still comply with BS III norm while

Discuss about role of older vehicles in increasing vehicular pollution

Remarks

Delhi pollution BS IV norms.

Considering the rise of air pollution specially in Urban India Govt. of India took following step.

① Banning 10 year old diesel vehicle in NCR region.

② shifting from BS IV norm to BS VI norm for reducing carbon emission.

③ monitoring measure like National Ambient Air Quality Index, SAFAR, Nation air quality Indep. etc.

Explain each of the point

④ ~~Sustain~~ push to E-vehicle and hybrid vehicle by FAME scheme.

⑤ Imposing a carbon ~~coal~~ tax on coal based thermal power plant.

Make these points self explanatory

⑥ Establishing EPCA,

⑦ NITI Aayog "Breathe India" program.

⑧ Banning pet coke & furnace oil

Remarks

① International collaboration with Netherland in National Clean Air Programme in India.

World bank suggested that by 2050 50% of India reside in Urban area. Hence there is need for sustain effort to curb air pollution and shift towards more Greener and sustainable means of industrialisation and mode of transport.

3½

Remarks

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)

Remarks

Remarks

Remarks

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)

Recently in 2018, Shimla have undergo acute water crisis causing it to restrict traveller and visitor in city.

Discuss about NITI Ayog report in relation to the context

One of the major source of fresh water in himalayan region are springs nearly accounting 70% of water need.

Elaborate the significance of himalayan Spring well?

The reason for drying of spring well:

- Natural factor like less rainfall, tectonic activity leading to shifting of river or spring etc.
- Anthropogenic factor like overexploitation, Deforestation which led to fall in water tables.
- Encroachment of spring shed and lead to decrease water inflow to spring.

good

Remarks

⊙ Global phenomenon like climate change, weaking of western disturbances, melting of glacier also affected springs.

This require both structural and non-structural solution.

Structural solution include ~~use~~ spring shed development, check dams; water harvesting technique for restoration of water. Also building of moraines to contain glacier lake.

Brief discuss each solution

Non-structural solution like afforestation to mitigate climate change variabilities and to rejuvenate springs. Other measure like behaviour change in demand of water, Recycle and waste treatment of water. Also sustainable agriculture practices including reducing water use, fertilizer, pesticide need to ~~take~~ taken up.

Remarks

To successfully address the problem of drying of spring, we need to ensure spring shed model of development taking the entire ecological approach.

5 1/2

Remarks

Q16. What do you understand by geo-engineering? 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)

Geo-engineering is the emerging field in Engineering. In this engineering technique are employed in altering the Geo climate such as solar radiation management, Green house gas removal etc.

Geo Engineering is seen as a potent technique to mitigate climate change. Technique like

Relevant points

- ① cloud Brightning to increase albedo of cloud.
- ② Injecting aerosol to upper atmosphere to reflect back solar radiation.
- ③ space mirror, cirrus cloud thinning.
- ④ carbon sequestration to store excess carbon.
- ⑤ Ocean Acidification to increase carbon in Ocean.

good

Remarks

India recieve monsoon in two phase one in south west monsoon and other in North east monsoon called as Retreating monsoon. N-E monsoon cover some area of Andhra pradesh and parcularly Tamil Nadu.

However it bring less rainfall far below it's actual potential as evident in chennai drought is mainly due to increase in relative humidity of air due to which it requires more moisture for condensation.

This increase in relative humidity is due to warming of ocean mainly Bay of Bengal and wind flowing over it.

Geo Engineering can help to reduce ocean temperature by 1-2°C to decrease relative humidity of air and help in condensation.

Reason/concept of North East monsoon explain why there is low rainfall

Remarks

Technique like Aerosol spraying, cloud ~~brig~~ brighting, space mirror can help to decrease temperature.

However. Geo engineering technique is still in a research phase and it's long term impact need to be studied. further for sustainable solution, climate change mitigation measure need to be ensure like Afforestation, sustainable fishing practice to increase bio mass in Ocean, International collaboration etc.

Good

5½

Remarks

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)

India have 30% population living in urban area which is expected to reach to 50% by 2050 {world bank}.

The unregulated urbanization which is manifested in growing slums, encroachment city drainage area, illegal construction without necessary infrastructure and basic sanitation facility are major source of problem. It has created major pollution source and health hazard.

- without proper waste collection and waste segregation, it pollute both land & water.
- unsustainable land fill can lead to leaching of heavy metal & pollutant to water and may also vulnerable to fire adding air pollution

Relevant points

Remarks

- Polluted water are responsible for major health hazard: If the pollutant will enter in food chain through crops and sea food causing major problem.
- In 2018, IIT mumbai found plastic in salt. Plastic is also found in fish and other food source
- Metal & other pollutant by bio-magnification cause great health hazard.

Considering this, 40% on October 2014 launch Swatch Bharat Mission for waste treatment and stop open defication. The provision of it are follow

- It also for waste collection & waste treatment.
- It also create infrastructure like piped drainage system & toilet both for individual & community.

Remarks

⑥ It discourage open defecation.
⊙ It call for waste segregation at source by providing blue & green dustbin.

However it efficacy have remain limited mainly due to limited capacity of state for waste treatment, & non-point source of pollution are still high etc.

Elaborate its limitation in waste segregation

Hence strengthening the capacity of state and active involvement of citizen are required. Rapid urban development Agenda and scheme like AMRUT, Nurban, Smart city Slum development need to be focused,

Discuss role of e-waste sustainable management rules

6

Remarks

Q18. 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)

Good

e-waste refer the electronics waste that are generated by obsolete machine, laptop, mobile & others. with the rapidly growing technology and advancement, the e-waste is said to growing faster rate compared to other waste.

Other reason for faster generation of e-waste.

① Increase of income level and high consumerism of individuals. Explain your point

② There are still large section where electronics is not yet reach to that extent. so more possibilty of it use and waste.

③ More urbanisation will result in more waste generation. / Make your point very evident

Remarks

In India e-waste generation is more rapidly grow by more developed state like Gujrat & maharashtra.
India accounts of 4% of global e-waste which is likely to increase in near future.

Following step can be taken to manage e-waste

(i) To sustainably manage e-waste 3R's approach shall be used i.e Reduce, Reuse & Recycle.
Reduce the generation of e-waste by efficiently using the technology.
Recycle the e-waste so that maximum resource recovery can be done.
In India e-waste account for 70% landfill suggesting poor recycling.

(ii) Increase R&D investment for better recovery from e-waste.

(iii) ~~Extended~~ Producer extended responsibility to ensure waste collection

Relevant points

Discuss about adopting techniques of different countries like Israel recycles 80% of sewage water

Remarks

① Educating citizen about e-waste & mode of discarding electronic devices.

According GOI came up with e-waste rule which incorporated

Discuss about PRO & DRS for channelizing e-waste

② Producer extended responsibility to collect waste.

③ Collection center for collecting e-waste

④ Training & increasing capability of workers

However some challenges are that majority of e-waste are collected in informal sector and lack of comprehensive policy related to e-waste

Hence, there is need and opportunity for GOI to formalise e-waste collection & processing sector which can help in reducing environment degradation and provide economic benefit.

(6)

Remarks

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 are the unmanned flying aircraft which can used in myraid of task ranging from military to non-military task.

Recently Ministry of civil Aviation annoneed guideline to regulate civil drone activity.

Discuss the role of ministry of civil aviation in regulating drones

① It classify drone into Micro drone which can fly up to 50 ft, mini drone upto 50 - 500 ft & macro drone ~~upto~~ above 500 ft.

② It require for mini & macro drone to take permission for fly.

③ It set up Digitalsky platform for taking permission for fly. It also ensure "NO permission No fly"

Write it in single point

Remarks

④ Regulation also ban flying over strategic location like high sea and airport etc.

Drones can be used in various non-military activities like.

Explain this point

① Tourism & Recreation activities :- Drones can be used to enhance the experience of individual.

② Public policy :- Drone can be used in better data collection & can help in data driven policy formulation. like in situation like floods etc. It help in better assessment of situation.

Relevant point

③ Public transport & logistics : Drones can be effectively utilized for better traffic management & real time decongestion measures.

Drones can be utilised by providing deliveries by Amazon or Flipkart making more efficient & Quick.

Remarks

(4) Environment Surveillance : Drone can be used in surveillance of bio diversity in Eco-sensitive zones. It can also be use in monitory pollution level, cloud movement etc.

(5) Law & order : Drone can be use in maintain law & order situation by real time monitory of crowd movement ensuring the security of country.

Ministry of civil Aviation has ensure that by regulating Drone activity there should be balance b/w Development activities & adequate security of nation.

Good points

6 1/2

Remarks

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)

Relevant intro

Robotics is a advance field of scienc that deal with design, construction and operation of robot which are computer connected. not clear not clear It perform automated physical task that was earlier done by humans.

Robotics is developing field and have said to be various application in different field. Application in

Automobile

- Robot can increase production with improved efficiency, accuracy & more speedy.
- It can transform automobile through Driveless cars & transport.

Well Explained

Military Application

- Robots can replace soldier in difficult terrain which are responsible for casualities like Desert, hilly snow covered terrain.
- Robots can be use in surveillance & data collection beyond the borders.

Remarks

Health & Medicine

① Robots can help in accurately operating surgery with precise damage.

② Nano Robot can enhance drug delivery efficacy & efficacy.

Good Content

③ Agriculture

① Robots can help in better predict market, yeild, automated irrigation based on requirement of crop, pest management, weed management.

② It help in soil based & requirement based agriculture i.e custom agriculture.

Space Exploration

① Robot can help in mtn planet space exploration & deep space mission.

② they can help in insitu resource processing & data transfer

Remarks

Banking Sector

Robot can help in better operation efficiency by reducing cost of operation

- It can predict or forecast market situation etc loss profile of individual or Asset etc.
- Robot can help in big data analysis & Data mining.

According to reap benefit of Robotics Society of India registered in 2017.

It objective are :

- It consolidate effort & R&D for better develop of Robotics
- Collaboration with diff. agencies not clear
- Encourage Robotics & spread awareness.
- Promote research, training, teaching related to robotics.

→ nicely analysed

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Remarks