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GENERAL STUDIES (TEST CODE : 2843)

Name of Candidate	NIHAL RANDHAWA		
Medium Eng./Hindi	English	**Registration Number**	58123
Center		**Date**	1st Aug 2024

INDEX TABLE		
Q. No.	**Maximum Marks**	**Marks Obtained**
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
10	10	
11	15	
12	15	
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14	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 **HINDI & ENGLISH.**
   इसमें बीस प्रश्न हैं **हिन्दी और अंग्रेजी** 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।

Is student recommended for One-to-One mentoring?

Recommended	**Strongly Recommended**

EVALUATION INDICATORS

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

Overall Macro Comments / feedback / suggestions on Answer Booklet:

1.

2.

3.

4.

5.

6.

All the Best

1. अल नीनो-दक्षिणी दोलन (ENSO) की परिघटना की व्याख्या कीजिए। विशेष रूप से भारत का संदर्भ देते हुए, वैश्विक जलवायु पर इसके प्रभावों की विवेचना कीजिए। (उत्तर 150 शब्दों में दीजिए)

Explain the phenomenon of El Nino-Southern Oscillation (ENSO). Discuss its effects on the global climate, with specific reference to India. (Answer in 150 words) 10

El Nino Southern Oscillation is a periodic climate phenomenon, recurring every 3-5 years, whereat different times periods cold or warm weather conditions occur off. the coast of Central America and South America

El Nino and LA Nina

	El Nino	La Nina
	GLOBAL CLIMATE EFFECTS	
1)	Warmer than average climate off the coast of Peru, Chile etc.	Colder than average climate off the coasts
2)	Weaker trade wind	Strong trade winds
3)	Higher rainfall in South American pacific coastline but weak rainfall in Australia Eastern Coast.	Lower rainfall in South American coast but higher rainfall in Australia and South East Asia.
4)	Leads to ~~week~~ weak monsoon.	Leads to strong monsoons.

ENSO Impact on Indian Climate

1) El Nino leads to weak Indian monsoons and La Nina leads to strong Summer monsoons.

2) Due to weak trade winds of El Nino the North West Monsoons are weakened and leads to lower rainfall in Winter Monsoons of Tamil Nadu.

3) Due to Strong Trade Winds of La Nina the North West Monsoon is strengthened and high rainfall occurs in Winter in Tamil Nadu.

4) Weak monsoons lead to drought like conditions

5) La Nina leads to colder than usual winters in North India.

6) El Nino leads to mild winters.

Thus, ENSO is an important global phenomenon which influences global climate patterns.

2. कायांतरण को प्रभावित करने वाले विभिन्न कारकों का वर्णन करते हुए कायांतरित शैल के महत्व पर प्रकाश डालिए। (उत्तर 150 शब्दों में दें)

Describing the different factors that influence metamorphism, highlight the significance of metamorphic rocks. (Answer in 150 words) 10

Metamorphism is the process by which rocks are transformed by application of external factors like pressure, heat, chemical reactions etc. These new rocks are called Metamorphic Rocks for eg. Gneiss; Schist; Graphite etc.

Factors influencing Metamorphic Rock Formation

1) Pressure : Pressure inside Earth's Crust causes metamorphism.

2) Heat : Extreme Heat from inside the Earth's surface due to molten magma.

3) Chemical Reactions : Rocks change form due to chemical reactions by interaction with chemically active substances like rainwater.

Significance of Metamorphic Rocks

1) Geological Significance - Used to figure out the geological history of a place

2) Tectonic Significance - Presence of metamorphic rocks help geologists figure out plate tectonic movements

3) Mineral / Resource Significance - Metamorphic rocks are valuable resources for industrial use. For eg- Graphite, Slate etc

4) Construction Use - Marble, Slate etc.

5) Industrial Use - Graphite as a conductor; moderators in nuclear power plants.

Thus, metamorphic rocks are significant from a natural as well as human perspective.

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

3. तड़ित झंझा क्या है और इसकी उत्पत्ति किस प्रकार होती है? तड़ित झंझा के जीवनचक्र के विभिन्न चरणों का विवरण दीजिए। (उत्तर 150 शब्दों में दीजिए)

What is a thunderstorm and how is it formed? Give an account of the different stages in the lifecycle of a thunderstorm. (Answer in 150 words) 10

A thunderstorm is a weather phenomenon of intense rainfall accompanied by thunder and lightning. It usually occurs in summer months.

Formation of Thunderstorm

1) Conditions are of high temperature; humidity; low pressure leading to evaporation from surface and updraft of water vapour laden air.

2) As this cumulus cloud rises the temperature falls and and ice formation occurs.

3) The heavy air thus proceeds to descend in a downdraft and friction between ice particles causes electrical charges to form leading to lightning and thunder

4) The charged clouds also charge the surface leading to cloud to surface lightning as well
5) The accumulated water falls in form of rainfall.

Stages in life Cycle of Thunderstorm

Initial Phase: High temperature leads to low pressure and rising winds.

Mature Phase: Rainfall, thunder and lightning take place.

End Phase: As the rainfall occurs there is also downdraft of wind to the surface. This reduces the temperature and increases the pressure (atmospheric).

Thus the condition for thunderstorm formation are not present and the thunderstorm ceases

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4. भारत को बांस-आधारित उद्योगों के विकास हेतु उपयुक्त बनाने वाले कारक कौन-से हैं? (उत्तर 150 शब्दों में दें)

What are the factors that make India suitable for the development of bamboo-based industries? (Answer in 150 words) 10

Bamboo based industries are very prominent in the Indian economy as India is the 2nd largest manufacturer of Bamboo based products globally after China.

Important locations of this industry:

a) Madhya Pradesh - Largest state

b) Bengal and North East.

Factors that make India Suitable for Bamboo Based Industries

1) Historical : Long legacy of crafts and goods made of bamboo. For eg. Bamboo Stilt houses in Assam.

2) Geographical : Bamboo can grow well in Alluvial Soil ; High Temperature High Humidity regions like West Bengal or North East India.

3) Labour : Presence of many skilled artisans, craftsmen who develop bamboo based goods for sale.

4) Low Capital Cost to set up the plantation.

5) Short Gestation Period before bamboo saplings can be commercially exploited.

6) Not a very specialised setup in terms of irrigation requirements etc.

7) Great domestic market demand for bamboo based products

8) Regulatory support from the government as seen in recent change in Indian Forest Act classifying Bamboo as Grass thereby making it easier to commercially develop.

Thus, India needs to explore the potential of this growing wonder grass by focusing on Bamboo Cultivation; Manufacturing and Export.

5. भारत में भूतापीय ऊर्जा के लिए संभावित स्थलों का उल्लेख कीजिए। भारत अभी भी भू-तापीय ऊर्जा का उपयोग करने के शुरुआती चरण में क्यों है? (उत्तर 150 शब्दों में दें)

State the potential sites for geothermal energy in India. Why is India still at a nascent stage of utilization of geothermal energy? (Answer in 150 words) 10

Geothermal energy is renewable energy source where heat from inside Earth's surface is released in the form of hot water springs; steam/vapour; heated rocks at the surface.

Potential Geothermal Sites in India:

a) Ladakh : Puga site

b) Himachal Pradesh : Manikaran

c) Uttarakhand : Hot water springs

d) Gujarat Maharashtra : Cambay Basin

Challenges for Geothermal Energy India

1) Competition with other renewable sources such as Solar or Wind Energy where greater government and private investment has taken place.

2 2) Geothermal energy is 3-4 times more expensive in Capital Investment terms than other comparable Renewable Energy Sources

3) latest technology required for drilling in order to exploit geothermal energy.

4) Remote location and In Siter Generation requirements are another challenge both in ~~setup~~ set up terms maintenance and operational terms as well as energy transmission related losses.

5) Many hot water springs have great religious or cultural significance. For eg. Manikaran Gurudwara in Himachal Pradesh which makes it challenging to set up a power generation factory or site.

However, the government is cognisant of the potential benefits of geothermal energy and has signed an MoU with Iceland to develop Puga, Ladakh in 2021 as well as set an aim for overall 10GW energy generation

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6. भूमि-उपयोग परिवर्तनों के कारण भारत में प्राकृतिक आपदाओं की घटनाएं बढ़ी हैं। कैसे? (उत्तर 150 शब्दों में दीजिए)

Land-use changes are leading to increased occurrences of natural disasters in India. How? (Answer in 150 words) 10

Land Use changes refers to human activities changing the usage pattern of a particular area usually from Forest or Agricultural to Commercial or Residential.

Land Use Change Pattern in India

1) Increasing Urbanisation over decades leads to conversion of Agricultural land to either Residential land or Commercial land / Industrial land. For eg. Amravati in Andhra Pradesh where prime agricultural land is converted to create a new capital city.

2) Growing population pressure leads to conversion of Reserved Forest into Agricultural Land.

3) Wrong farming practices lead to increasing desertification. Eg. Edges of the Thar desert in Rajasthan, Haryana and Punjab.

Land Use Changes and Natural Disasters

1) Droughts: a) Loss of vegetation leads to reduced transpiration and lower rainfall.

b) Concretisation leads to run off of rainwater instead of replenishment of ground water table.

2) Floods: a) Loss of urban wetlands by conversion into built up area lead to urban flooding. For eg. Bangalore where lakes are encroached..

b) Seasonal streams are blocked leading to floods.

3) Heat Waves: Urban heat islands exacerbate hot conditions to dangerous levels.

4) Cold Waves: Urban concretisation and building materials trap cold air during cold waves.

Thus, we can see that unscientific and unscrupulous impact of land use change is felt deeply when natural disasters strike.

7. भारत आपदा नियोजन, शमन और प्रतिक्रिया संबंधी अपनी कार्यविधि को बेहतर बनाने के लिए भौगोलिक सूचना प्रणाली (GIS) की क्षमताओं का उपयोग किस प्रकार कर सकता है? (उत्तर 150 शब्दों में दीजिए)

How can India harness the capabilities of Geographic Information Systems (GIS) to enhance its approach to disaster planning, mitigation, and response? (Answer in 150 words) 10

Geographic Information Systems (GIS) refers to the use of Information and Technology tool in the geographic domain to create a spatial map of an area highlighting all relevant aspects of the geography, weather, ~~urban~~ human settlements etc.

GIS Use in Disaster Planning

1) GIS can act as a tool to aid in planning. For eg. Identification of Seismic Active Zones and classifying into 5 based on risk.

2) GIS can act in micro planning and create street level risk assessment strategies. For eg- In cities specific localities can be identified which are lower lying and risk flooding.

3) Can be used to map safe shelters, hospitals, fire station etc. and can incorporate them in GIS maps.

GIS Use in Disaster Response and Mitigation

1) Weather monitoring can predict certain events like Cyclones or Rain Storms upto a few days in advance.

2) GIS tools can help direct first responders to known human habitats in event of destruction due to earthquake or landslides by keeping satellite photos mapped to lat/long.

3) Satellites imagery can also detect real time rescue operations.

4) After disaster GIS satellites can assess impact and aid can be distributed accordingly.

5) Learning scientifically from on event can lead to guidelines being applied elsewhere.

Seeing the benefit of GIS tool the Indian Government has made them a mainstay of our disaster response toolkit

8. पर्यावरण संरक्षण एवं जैव-विविधता पुनर्बहाली के संदर्भ में, 'रिवाइल्डिंग' की अवधारणा को स्पष्ट कीजिए। रिवाइल्डिंग पहलों का मार्गदर्शन करने वाले सिद्धांत क्या होने चाहिए? (उत्तर 150 शब्दों में दें)

In the context of environmental conservation and biodiversity restoration, state the concept of 'rewilding.' What should be the principles guiding the rewilding initiatives? (Answer in 150 words) **10**

Rewilding is an Environment Conservation technique which refers to restoring ecosystems damaged by human activities by allowing wildlife and natural processes to reclaim those areas.

Principles of Rewilding

1) Focus on 3 C's - Core, Conservation Corridor and Carnivore.
2) The Core area should be free of human interference.
3) There should be Corridors between Core Areas so that wildlife can safely transition in order to avoid overpopulation pressures. For eg. Overpopulation of Lions in Gir National Park, Gujarat leads to human-lion conflicts.
4) Carnivores are main focus as being keystone

species the entire Food Web depends on presence of Apex Predators. For eg. Re-introduction of Cheetahs in Kuno National Park, Madhya Pradesh may lead to Rewilding of entire area.

5) Focus on entire ecological benefit and not narrow human benefits only.
6) Human intervention and design to be minimized, focus on letting nature adjust dynamically and settles in an equilibrium.

Thus, Rewilding is a unique approach to conservation where nature is allowed to heal itself without human interference and minimum human intervention.

9. पिछले कुछ वर्षों से भारत के विभिन्न हिस्सों में प्रकाश प्रदूषण में निरंतर वृद्धि क्यों हो रही है? जैविक जीवों पर इसका क्या प्रभाव पड़ता है? (उत्तर 150 शब्दों में दें)

Why has light pollution been on a steady rise in various parts of India for the past few years? What are its implications on biological organisms? (Answer in 150 words) 10

Light Pollution refers to harmful, excessive light generated by man-made activities during the night time.

Rise in Indian Context

1) Increasing Urbanisation (28.5% in 2001 census and now estimated to be 34%)

2) Fons Economic growth and increasing industrialisation, factories, offices etc.

3) Growing consumption culture and affluence with increase in vehicle ownership.

4) Greater supply of electricity in nightime to rural/remote areas overtime.

5) Affordable light sources such as LED bulbs and growing street lightification

Implications on Plantlife

1) Pollination cycle is disturbed for certain nightime species of butterflies and other

pollinators.

2) Photosynthesis and respiratory cycle is affected as nightlights mess with biological instincts

3) Deciduous plants shedding cycle governed by length of day is affected.

Implications on Animals

1) Circadian rhythm of all animal, including humans is affected leading to lifestyle disorders and diseases.

2) Migratory species use moonlight for navigation and their ability to do so is disrupted.

3) Hibernation cycle disrupted as governed by decreasing length of day to indicate winter onset.

4) Moths and other insects die out as they get attracted to man made light.

Seeing the dangerous implications of light pollution there needs to be a scientific design of new light sources such that they only point downwards; focused beams are used; smart lighting solutions can be mandated

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

10. आक्रामक विदेशी प्रजातियों की आबादी में वृद्धि और उनके प्रसार के लिए कौन-से कारण उत्तरदायी हैं? ये भारत जैसे देश के लिए किस प्रकार विशेष रूप से हानिकारक हैं? (उत्तर 150 शब्दों में दें)

What are the reasons behind the increasing growth and spread of invasive alien species? How are they particularly harmful for a country like India? (Answer in 150 words) 10

Invasive Alien Species refers to Plant or Animal species foreign to a particular area but which when introduced outcompetes the naturally occuring species and forms a dominant position in the local ecosystem. For eg. Water Hyacinth & Tuliflora in India.

Reasons being Growth

1) Most common cause is introduction by human activities.
2) Trade, Globalisation and Migration biggest factors.
3) Can also be introduced for economic exploitation For eg Eucalyptus in India.

Reason behind Spread

1) Can prove more hardy or adept than locale species. For eg. Congress Grass is a weed which is more durable so invades and grows throughout India.

2) Can Outcompete other species. For eg. Eucalyptus more adept at absorbing ground water so thrives but also kills competition by reducing water availability.

3) May have no natural predators in the region to limit its growth.

Harmful effects in India

1) Loss of local biodiversity and consequent economic, ecological and cultural impact.
2) Can cause harm to soil nutrient capacity.
3) May reduce water table drastically. Eg Eucalyptus.
4) May choke water bodies. Eg. Water Hyacinth covering lake surface killing other species by reducing oxygenation.
5) Can Cause diseases. Eg Dengue bearing mosquitoes are alien to India.

Seeing these harms, IUCN has estimated Invasive Alien Species to be in the top 3 causes of biodiversity loss and extinction over the last few decades.

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

11. क्षेत्रीय जलवायु और स्थानीय पारिस्थितिक तंत्र पर हिमालय पर्वत श्रृंखला के प्रभाव का आकलन कीजिए। (उत्तर 250 शब्दों में दीजिए)

Assess the influence of the Himalayan mountain range on regional climate and local ecosystems. (Answer in 250 words) 15

The Himalayan Mountain Range is a ~~Block~~ Fold Mountain Range formed by the convergence of the Indo-Australian Plate with the Eurasian Plate. The resultant upliftment of Tethys Sea Rocks led to formation of youngest, highest peaks in the world, a process continuing till today.

The Himalayan Mountain range spans from ~~Pak~~ Afghanistan, Pakistan, India, Nepal, Bhutan, China till Myanmar from West to East.

Himalayan Influence on Regional Climate

1) Prevent cold Siberian winds from reaching plains of North India leading to hot summers and mild winters in the subcontinent.

2) Key role in formation and location of Inter Tropic Convergence Zone (ITCZ) which causes monsoons.

3) High altitude leads to Poorbi Monsoon Winds travelling from East to West of the Bay of Bengal branch.

4) Rain shadow region to North in Ladakh and Tibet.

5) Melting of glaciers lead to great river systems of Indus, Brahmaputra and Ganga and their tributaries.

Himalayan Influence on Local Ecosystems

PROVISIONING EFFECT:

1) Timber, pine, and other temperate trees and their products.
2) Apple orchards, strawberries, and other high altitude fruits.
3) Tea plantations in North Eastern Himalayas.
4) Alluvial soil in North Indian plains and rivers/water to sustain agriculture there.

REGULATING EFFECT:

1) Climate Control
2) Carbon Sequestration in Glaciers.
3) Flood Control
4) Water purification.

SUPPORTING SERVICES:

1) Carbon cycle and other mineral cycles.
2) Production of Oxygen via Photosynthesis
3) Perennial rivers for Plains.

CULTURAL EFFECT:

- Himalayas have great religious significance across religions. Hinduism has pilgrimage sites such as Vaishno Devi or Amarnath Yatra; Sikhism has Manikaran Sahib; Buddhists consider Tibet to be home of Dalai Lama etc.
- Himalayan Tourism - Trekking; Winter Sports like Skiing in Gulmarg etc.

However, Himalayas are threatened by climate change and it is imperative that the world in general and the region in particular take steps to preserve this delicate and fragile ecosystem.

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

12. भूमध्यरेखीय क्षेत्र में पाई जाने वाली जलवायुविक और वानस्पतिक विशेषताओं को वर्णित कीजिए। ये इस क्षेत्र में स्थित देशों के समग्र विकास को कैसे प्रभावित करती हैं? (उत्तर 250 शब्दों में दीजिए)

Outline the characteristics of the climate and vegetation in the equatorial region. How do they affect the overall development of countries lying in this region? (Answer in 250 words) 15

Equatorial region is the region around 10°N and 10°S band of the Equator comprising of countries like Peru, Brazil, Congo etc.

Climate and Vegetation of Equatorial Region

1) High Rainfall due to evaporation of water due to Insolation.
2) Frequent thunderstorms due to low pressure high temperature.
3) Heavy humidity due to rainfall.
4) 2 seasons annually, wet and dry.
5) ~~Not much~~ annual range of temperature. Small difference
6) Rainforests type vegetation with ~~trees~~ Evergreen trees like Mahogany, Teak etc.
7) Soil is acidic due to low decomposition of litter.

8) Epiphytes present due to heavy canopies preventing sunlight from reaching ground level.

9) Extremely biodiverse with many Biodiversity hotspots. Eg. Amazon rainforests of Brazil.

10) Soil is not nutrient-rich so does not support intensive agriculture.

Effect on Overall Development of Equatorial Countries

Economic Impact :

1) Not conducive for food crops.

2) Plantation agriculture practiced can be supported by soil characteristics. Eg. Palm Oil or Rubber in Malaysia.

3) Export crops like Cocoa, Coffee etc. require unique characteristics of high temperature and humidity. Eg- Coffee plantations in Brazil or Sugarcane in Cuba.

Cultural Impact : Support many tribes living symbiotically with rainforests. Eg. Uncontacted tribes in Amazon.

Tourism Impact : Wildlife reserves extremely popular due to huge endemic biodiversity species richness.

Ecological Impact : Rainforests provide 4 types of Ecosystem Services to the countries :- Provisioning [Medicine, Wood, Food etc.] ; Regulating [Climate, Rainfall, Flood Control etc.]; Cultural [Tourism, Religious etc.] ; Supporting [Nutrients cycling, Soil formation etc.].

Thus, we can see the important role played by equatorial climate in the makeup of the nation.

13. विश्व भर में पर्माफ्रॉस्ट क्षेत्रों की पहचान कीजिए। पर्माफ्रॉस्ट का पिघलना वैश्विक जलवायु और पारिस्थितिक तंत्र के लिए एक व्यापक खतरे के रूप में कैसे उभरा है? (उत्तर 250 शब्दों में दीजिए)

Identify the permafrost regions around the world. How has thawing permafrost emerged as a significant threat to global climate and ecosystem? (Answer in 250 words) 15

Permafrost refers to areas where the temperature on average remains well below freezing point of water i.e. 0°C. This leads to situation when ground never thaws and is permanently frozen.

Permafrost Regions Globally :-

1) Arctic Tundra.
2) Antarctic Tundra.
3) Alpine Tundra – High altitude sites above in areas of Alps, Himalayas etc. ~~where~~ treeline level.

Reasons for Thawing Permafrost

1) Global temp increase due to anthropogenic climate change activities leads to higher temperatures

and thawing of the ground.

2) Local temperatures increase due to human activities like tourism activities in those regions.

Threat caused by Thawing Permafrost

1) Permafrost is an important Carbon Sink as it sequesters carbon in soil away from atmosphere. Its thawing may will increase global CO_2 stock and accelerate global warming.

2) Reduced Albedo Effect increases global warming.

3) Many unknown disease causing mirobes/viruses may be released from the Permafrost. Eg. Anthrax virus in Siberia observed recently.

4) Soil binding will loosen leading to topsoil erosion after thawing.

5) Many animals and plants like lichens depend on the permafrost ecosystem and will be negatively impacted.

6) May lead to changes in global climate as the High Pressure Belt of Poles may weaken leading to changes in Ocean Currents and Wind Patterns with consequent effects on climate.

Thus, we can see this threat. Some urgent steps to contain this are:

a) Global Collaborations in Arctic Circle and Antarctic Circle Countries.

b) Proper adherence to Paris Climate Agreement norms to limit increase in global average temperature to 2°C below Pre-Industrial Revolution temperature.

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

14. मरुस्थलों में विशाल संसाधन क्षमता विद्यमान है जिसे मानवीय उपयोग के लिए निष्कर्षित किया जा सकता है। विवेचना कीजिए। थार मरुस्थल की खनिज परिच्छेदिका (mineral profile) का सविस्तार वर्णन कीजिए। (उत्तर 250 शब्दों में दें)

Deserts have a huge resource potential which can be extracted for human use. Discuss. Elaborate on the mineral profile of the Thar desert. (Answer in 250 words) 15

Deserts refer to areas with minimal precipitation, annually below ~~250~~ 25cm. rainfall average, and a hostile environment for living beings. Deserts can be both Hot (Thar, Gobi, Sahara etc.) or Cold (Ladakh).

Resource Potential of Deserts

1) Certain trees and animals found can be useful for humans. For eg. ~~Date~~ Date trees ~~Date~~, or Camels from whom milk can be sourced.

2) Many natural minerals can ~~be found~~ be mined in deserts like Lithium in Bolivian desert or the Khetri Mines of Rajasthan.

3) Good ~~source~~ site for renewable energy generation sites like Solar Power in

Mojave Desert, USA or Wind Power Turbines in Rajasthan. This is because of abundance of sunlight annually, low land cost and prevailing local winds.

4) With proper irrigation desert land can be converted into fruitful agricultural land.

5) Sand dunes are a tourism attraction.

6) Desert lands are also useful for experimental scientific work such as nuclear ~~expo~~ explosions in Jaisalmer.

Mineral Profile of Thar Desert

Thar desert in Rajasthan is the only hot desert in India. It has a mineral base of certain alloys of Tin and Copper which is present in Khetri Mines and used

since Harappan times to make Bronze.

There are also iron mine sites alongwith nickel and tin.

There is also Rock Salt present and Salt Mining takes place on a vast scale in Sambhar Lake near Jaipur.

Thus, we can see the great potential for development present even in the desert areas.

15. भारत में आई.टी. उद्योग, जो पहले कुछ प्रमुख शहरों में ही केंद्रित था, का अब टियर-2 और टियर-3 शहरों की ओर उल्लेखनीय विकेंद्रीकरण हो रहा है। कारण बताइए। (उत्तर 250 शब्दों में दें)

The IT industry in India, once centered in a few major cities, is now witnessing significant decentralization towards Tier-2 and Tier-3 cities. Provide reasons. (Answer in 250 words) 15

The IT revolution in India started in Bangalore and soon spread to Hyderabad and later Gurgaon. However, now it is witnessing further decentralisation with spread majorly observed in Tier 2 and Tier 3 sites like Pune, Kolkata Bhubhaneshwar, Noida, Jaipur etc.

Reasons for this Decentralizing Trend

1) The high costs of living in the original IT Hubs with Bangalore becoming one of the most expensive real estate locations of the country.
2) New startups unable to afford offices in these sites.
3) Lack of Space in original sites.

4) Higher salaries demanded in Bangalore hires compared to say Pune hires for similar workers.

5) Covid accelerating shift due to Work From Home trend where companies found it feasible for employees to work remotely so they were able to decentralize.

6) Other State Governments giving generous subsidies to attract IT firms to them. Eg. Kolkata setting up IT Hub in Newtown where CISCO, TCS have set up offices.

7) More startups being formed in IT Sector catering to tier 2 or tier 3 cities so they have offices in those areas.

8) Freelance culture in IT Sector

where contractors from tier 2-3 cities live and work globally.

9) Unsavoury regionalist tendencies in Bangalore driving away migrants

By and large, this is a positive trend for India's Service Sector Development and it is to be hoped that the trend can lead to increase in per capita GDP and better quality jobs for the demographic bulge.

16. आकस्मिक सूखे की बढ़ती घटनाओं से उत्पन्न चुनौतियों का शमन करने के लिए आवश्यक उपायों पर चर्चा कीजिए। (उत्तर 250 शब्दों में दीजिए)

Discuss the measures required to mitigate the challenges presented by the increasing occurrences of flash droughts. (Answer in 250 words) 15

Flash droughts are a recent challenge where droughts are characterised by Rapid Onset, great Intensity and Severe Impact over a Relatively Short Timescale; usually a few days or weeks.

Unique Challenges of Flash Droughts

1) Short timescale leads to lack of preventive action unlike other traditionally understood droughts like hydrological or meteorological drought where authorities have more time to prepare for and even prevent it if possible.

2) Great intensity of these droughts may cause long term impact on Soil quality and nutritional status.

3) Hard to predict or take mitigative measures against.

Measures Required to Mitigate Flash Droughts

1) Active monitoring of all indicators like Weather Monitoring Systems ;

Weather indicators of Humidity; Aridity; Wet Bulb Temperature ; Soil Moisture levels ; Historical trends of these indicators etc. to be able to predict the occurence as much in advance as possible.

2) Reduce reliance on rain fed irrigation by providing canals, borewells etc.

3) Climate appropriate agricultural and industrial practices to be adopted so that water stress can be minimized

4) Use groundwater replenishing tactics like recent success story of groundwater recharge in Telangana using ancient Tank System

5) Take appropriate relief measures quickly at the onset of flash droughts.

6) Ensure provision of basic human requirements of food and water in case of ocurrence by setting up shelters and ~~setting~~ volunteer rescue teams.

Flash droughts are another manifestations of the extreme weather events brought along by the erratic effects of Climate Change and there needs to be a concerted efforts to adapt to it so that we can minimize the damage it causes.

17. भारत में हीट वेव के प्रति सुभेद्य आबादी के संरक्षण में मौजूदा हीट एक्शन प्लान (HAPs) की प्रभावशीलता का परीक्षण कीजिए। (उत्तर 250 शब्दों में दीजिए)

Examine the effectiveness of the existing Heat Action Plans (HAPs) in protecting the vulnerable population against heat waves in India. (Answer in 250 words) 15

India is one of the most vulnerable countries to the impact of Heat Waves with National Crime Records Bureau (NCRB) data showing over 10,000 deaths due to Heat Waves in the last decade.

The data further showed that the most deaths were caused in Andhra Pradesh while Uttar Pradesh was the state with the highest number of Heat Wave days, @ 219 in 2022.

Risks Caused to Vulnerable by Heat Waves

1) Heat waves are defined in relative (higher than usual average temperature) and absolute terms as well. Thus, they can impact any part of India, even traditionally cooler areas like Dehradun suffered from heat waves last year.

2) The Urban Heat Island effect exacerbates the danger to Urban Poor : Urban Homeless; Gig Economy Workers toiling in heat such as Food Relivery Employees ; Outdoor Workers at Construction Sites etc.

3) Rural population too is vulnerable due to unseasonal heat effect and exposure to Sun.

4) The unscientific way in which construction take place leading to zero ventilation houses.

5) High cost of electricity in peak summer and cost of Air Conditioners.

6) Climate Change increasing severity of Summer Climate.

Effectiveness of Heat Action Plans

Good / Positive Impact : 1) Early onset detection and alert mechanism of government to declare alerts

2) Regulations around preventing undue exposure to harsh weather for workers after dark.

3) Closure of schools, change in school/office timings to mitigate impact.

Negative Impact: 1) Purely reactive plan: all steps to be followed to mitigate impact but none to prevent it.

2) Can work on building codes; zoning laws; tree forestry in urban sites etc. to reduce urban heat island effect.

3) Construction work can be planned such that summer months are off limits

4) Plans to be more active than reactive.

Ultimately, the effectiveness of HAPs can be observed by the fact that neither are we able to prevent or reduce Heat Wave Days or stop it from killing the vulnerable population.

18. भारत द्वारा अपने आपदा प्रबंधन दृष्टिकोण को राहत-केंद्रित और प्रतिक्रियावादी दृष्टिकोण से अधिक व्यापक और सक्रिय दृष्टिकोण में बदलने की आवश्यकता है। परीक्षण कीजिए। (उत्तर 250 शब्दों में दीजिए)

India needs to shift its disaster management approach from relief-centric and reactionary to a more comprehensive and proactive one. Examine. (Answer in 250 words) 15

Disaster Management Approaches have undergone a paradigm shift in recent times (especially Sendai Framework) from being relief centric and reactive to proactive comprehensive ones focusing on Preparedness, Response and Rehabilitation as well.

Issues in India's Reactive Approach

1) Increased loss of life and property: Lack of prevention causes grave impact. For eg. Non Earthquake resilient buildings during Bhuj Earthquake collapsed leading to grave losses

2) Higher economic Costs: The cost of rehabilitation after disasters is higher than preventive measures.

3) Inefficient Response: Lack of training leads to reactive response culture. For eg After Surat Fire at Gaming Zone the reactive administration belatedly responded by enforcing fire safety norms in other buildings.

Benefits of Comprehensive and Proactive Disaster Management Approach

1) Reduces loss of life and damage to property: Can be seen in the Cyclone preparedness approach where the proactive system reduces deaths by a fraction of 100 compared to earlier tragedies. Eg. Supercyclone in Odisha in 90's killed 10,000 compared to much fewer deaths in recent cyclones.

2) The preventive measures like preparedness plans, safety drills can help reduce impact.

3) Vulnerability Analysis : Can lead to prevention of disasters in first place.

4) Capacity Building : Improves response to disasters by augmention of human, technological and material capability.

5) Global Collaboration : Can provide early warning. For eg- Early Tsunami Detection System in Indian Ocean present now.

Thus, we can see that India's disaster response suffers from major fundamental flaws. Due to increasing threats faced by Subcontinent as a result of climate change we need to reduce our vulnerability to these threats by adopting this proactive approach.

19. भारत के जैव-विविधता संरक्षण में नृजातीय और देशज समुदाय महत्वपूर्ण भूमिका निभाते हैं। कैसे? (उत्तर 250 शब्दों में दें)

Ethnic and indigenous communities play a significant role in the biodiversity conservation of India. How? (Answer in 250 words) 15

Ethnic and Indigenous communities have a unique, symbiotic relationship with their natural ecosystem be it Plants, Animals or even non living components like Rocks, Mountains or Rivers.

Role played in Biodiversity Conservation

1) Tribals in forests in Jharkhand like Chattisgarh like Gonds or Santhals have a unique cultural connection with the forests and help preserve many plants and animal species by preventing over exploitation.

2) Flagship Species Protection by ethnic tribes in Nagaland in form of

Amur Falcon Festival plays a keyrole in their conservation.

3) Traditional knowledge of herbs with useful medicinal or otherwise properties can lead to their proliferation and preservation of greater biodiversity.

4) Certain pastoral tribes such as Gaddis in Himachal Cause control of Wild Grass in Pastures which allows other species to also grow

5) Certain sites sacred to ethnic communities like Sholas (Groves) in Nilgiris are adopted as Community Reserves and preserved.

6) Government regulation also recognises this role and grants rights to certain tribes in terms of Forest

Land Rights Acts.

7) Certain Slash and Burn type activities can also cause biodiversity spread as the burnt area gets colonised again and goes through succession.

Thus, we can see the close relationship between ethnically rooted communities in India with the biodiversity around them. This traditional knowledge should be utilized in our conservation plans and incorporated in any such plans.

20. नेट जीरो उत्सर्जन की ओर बढ़ने की आवश्यकता क्यों है? भारत ने नेट जीरो लक्ष्य को प्राप्त करने के लिए क्या रणनीति अपनाई है? (उत्तर 250 शब्दों में दें)

Why is there a need to move towards net zero emissions? What strategy has India adopted to achieve the net zero target? (Answer in 250 words) 15

Net Zero Emissions is an energy usage strategy where any Carbon Emissions in the Environment is balanced by an equal amount of Carbon recovered from environment and sequestered away. This sequestration may be in form of Carbon Stock in Trees; Carbon Capture in Mines etc.

It has gained global relevance with many advanced economies pledging to become net zero emitters within a certain timespan. For eg. UK by 2050.

Need for Net Zero Emissions

1) Carbon Dioxide is a major contributor towards global warming

2) Global Warming causes Climate Change with devastating ecological, economic, Societal and humanitarian impact.

3) Carbon Dioxide (CO_2) in atmosphere has increased drastically due to Industrial Revolution and IPCC reports state that current levels of CO_2 emission could lead to 2°C rise above Pre Industrial Revolution levels by 2100.

4) Net Zero Emission only way to slowdown the impact of Greenhouse Effect.

5) According to Principle of Common but Differentiated Responsibility [CBDR] advanced economies enjoyed the benefits of polluting Globall Commons and became developed but developing economies cannot be forced to curtail economic advancement in name of climate change response. So need of the hour is for advanced countries to become Net Negative not just Net Zero.

India's Strategy for Net Zero

1) India has ~~adopted~~ self imposed ambitious ~~its~~ targets under Paris Climate Change Agreement norms and also achieved them in interim targets.

2) India aims to ~~reduce~~ increase the amount of Carbon sequestered in Forests

3) India aims to reduce Carbon Intensity of GDP growth by adopting a more renewable centric energy mix from its current coal dependent one. Global alliances like International Solar Alliance are steps in this direction.

Thus, India and the World need to balance the twin aspirations of Growth and Development - together Net Zero Status is a huge positive step towards that goal.