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GENERAL STUDIES (TEST CODE : 1485)

Name of Candidate	JASPINDER SINGH	Registration Number	788454
Medium Eng./Hindi	ENGLISH	Date	
Center	—		

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	
13	15	
14	15	
15	15	
16	15	
17	15	
18	15	
19	15	
20	15	

Total Marks Obtained:

Remarks:

INSTRUCTIONS

- 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)।
- There are TWENTY questions printed in ENGLISH & HINDI
इसमें बीस प्रश्न हैं अंग्रेजी और हिन्दी में छपे हैं।
- All questions are compulsory.
सभी प्रश्न अनिवार्य हैं।
- The number of marks carried by a question/part is indicated against it.
प्रत्येक प्रश्न/भाग के अंक उसके सामने दिए गए हैं।
- 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 than 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।
- Word limit in questions, if specified, should be adhered to.
प्रश्नों में शब्द सीमा, जहाँ विनिर्दिष्ट है, का अनुसरण किया जाना चाहिए।
- 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।

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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.

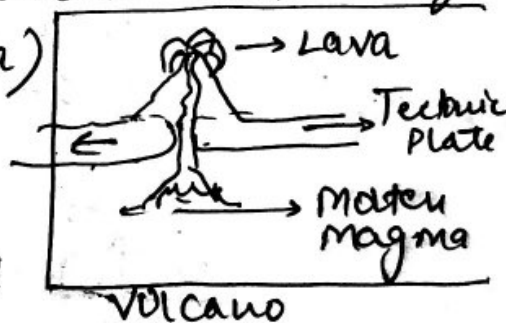
6.

1. Explain how the theory of Plate Tectonics helps in understanding the mechanism of volcanism. (150 words) 10

ब्याख्या कीजिए कि प्लेट विवर्तनिकी सिद्धांत ज्वालामुखी की क्रियाविधि को समझने में किस प्रकार सहायता करता है।

The Theory of Plate Tectonics, given by Morgan explains that the Earth's crust is divided into different Tectonic plates which are floating over Asthenosphere (Upper Mantle). This theory explains volcanism in the following way :-

(i) Volcanoes are the geographical features of earth where lava oozes out (Molten Magma)



(ii) At the meeting points of different plates following 3 movements take place -

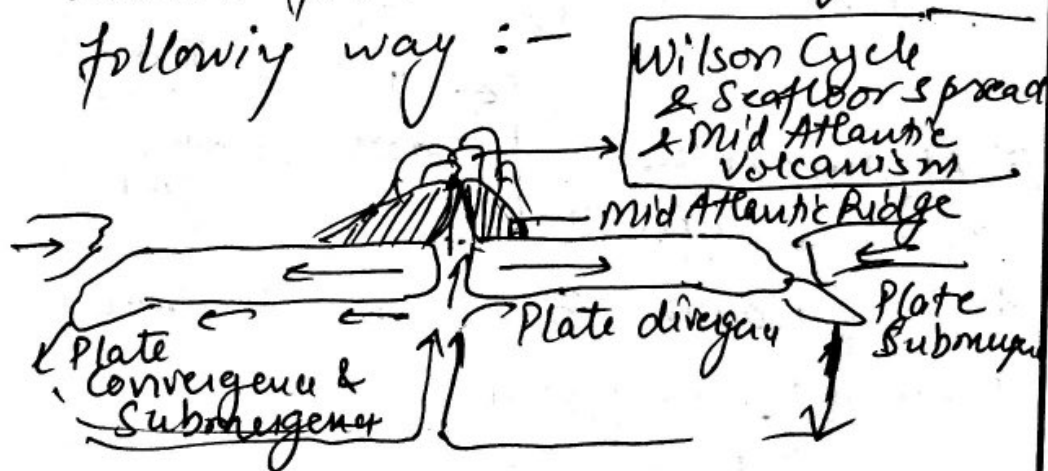
- Convergence
- Divergence
- Transverse Movement.

(iii) At the point of convergence of 2 plates, one plate subsides under the other plate and crust of submerged plate melts

(iv) At the point of divergence of 2 plates, the magma in the molten form oozes out of earth and volcanism takes place.

⇒ This explains the presence of volcanoes at the boundaries of Pacific Ocean, which makes it ring of Pacific fires.

⇒ It also forms Wilson cycle as per Plate-tectonic's further explanation and consolidates the reason for volcanic activity in following way :-



In this way volcanoes are formed at places where tectonic plates diverge (be it Oceanic-Oceanic divergence, Oceanic-Continental divergence or Continental Continental divergence.)

2. What is ice-albedo feedback and how is it related to climate change?

(150 words) 10

आइस-एल्बिडो फीडबैक क्या है और यह जलवायु परिवर्तन से किस प्रकार संबंधित है?

Ice Albedo Feedback means reflection of ~~Earth~~ Sun's heat back into atmosphere (or space)

Importance :- The mountains, glaciers covered with ice do not absorb the sun rays/heat, but reflect it away, without raising Earth's temperature. So they do not allow earth to heat up.

Reason: Ice acts as mirror which reflect away the sun rays.

Ice Albedo & Climate Change:-

(i) Due to climate change, Earth is warming up at a faster pace. Ice at poles, glaciers and mountains is melting, which leads to lesser reflection of Sun ray's/sun's heat. This further leads to earth absorbing more heat and increases the

temperature of earth.

(ii) Rising temperature due to global warming again fastens the melting of ice and impact of Ice Albedo is reduced. Earth reflects ~~more~~ low wavelength rays (Infrared radiation) absorbed by atmosphere, further rising the temperature of earth.

Therefore due to decreasing Polar Ice caps, albedo is decreasing and global warming is increasing. We need to focus on SDGs to fight against climate change and maintain the Ice albedo of Earth's Polar Caps & glaciers.

3. Give an account of the increasing frequency of cyclonic activity in the Arabian Sea region. (150 words) 10

अरब सागर क्षेत्र में चक्रवाती गतिविधि की बढ़ती आवृत्ति का विवरण प्रस्तुत कीजिए।

Due to climate change and global warming, the consequences borne by various parts of earth are non-predictable. One of ~~of~~ these consequences is frequent cyclonic activity in Arabian Sea.

Eg: (a) Cyclone Ockhi in 2017
(b) Cyclone Nisarga in 2020

Background: Normally, Bay-of Bengal is more favourable for cyclones to emerge, over Arabian Sea as Arabian Sea is surrounded by greater masses of land, and lesser rivers discharge into Arabian Sea. But recent phenomenon of Tropical cyclones in Arabian Sea are exceptional.

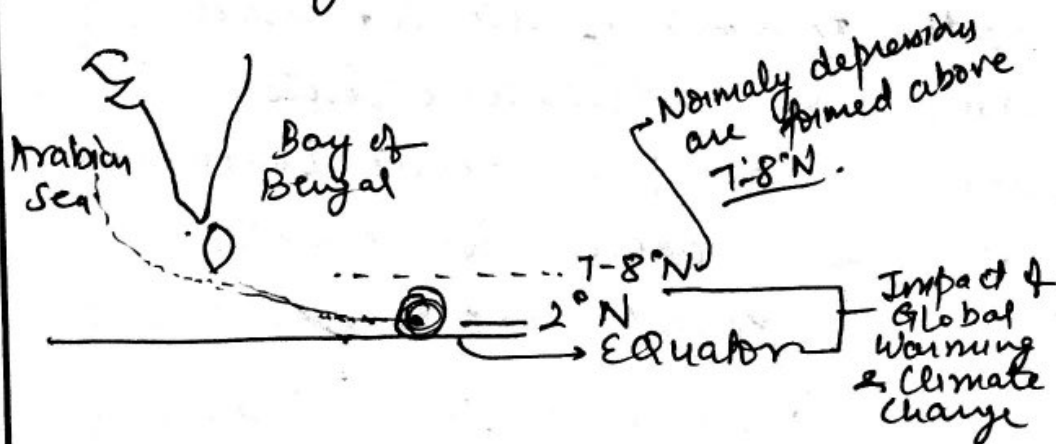
Reasons: Cyclone is formed due to depression at the sea when

atmospheric pressure decreases.

Due to climatic changes following things have taken place :-

(i) Cyclone Ockhi was exceptionally formed at 2°N latitude, so it when moved towards Indian subcontinent crossed Sri Lanka and entered Bay Arabian Sea, rather than entering Bay of Bengal, where it picked up more moisture

(ii) Due to patterns like MO. (M-Oscillations) depression over Arabian Sea develops and leads to formation of tropical cyclone (eg: Nisarga in 2020 at Alibag, near Maharashtra)



- उष्णकटिबंधीय क्षेत्रों की तुलना में शीतोष्ण कटिबंधीय क्षेत्र मत्स्य-ग्रहण हेतु अधिक उपयुक्त है। व्याख्या कीजिए।

Such pleasant temperatures, (upwelling of fresh water from beneath) makes them breeding ground for fishing.

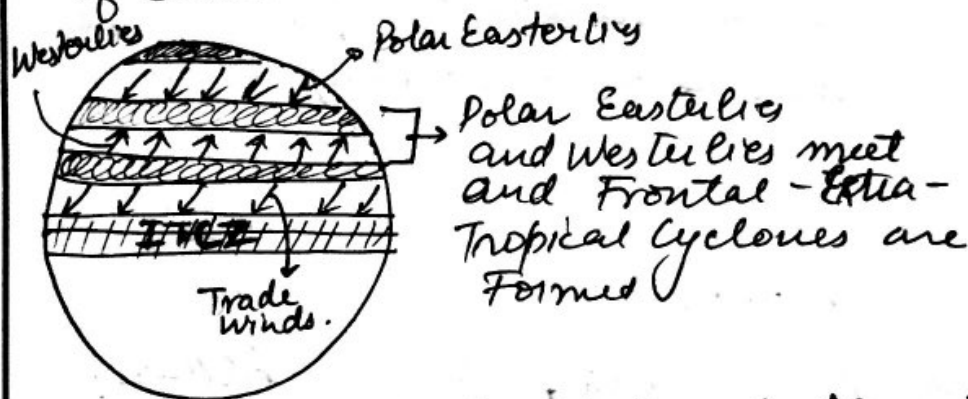
1) Nevada Coast: Cold Current - Labrador
Warm Current - Atlantic Gulf
Current

2) London: Polar Current + Atlantic Gulf
(c) (w) Current

3) Japan: ~~Ookhi~~ and Oyashio (c) and
Kuroshio (w) current meet.

⇒ They become breeding grounds for fishes as they have pleasant temperature and fresh water.

Air Currents : At temperate latitudes Cold^{air} currents from Polar region and Warm^{air} current from tropics converge leading to moderate temperature and temperate cyclones. i.e. more rains and hence fresh water. This promotes fishing at temperate zones of Earth.



Therefore Air Circulation of Atmosphere and Ocean Current Circulation of Oceans are the reasons of pleasant temperature and climate of Temperate Regions. This boosts their ~~economy~~ Fisheries and blue-Economy.

5. Explain the reasons behind development of horticulture and wine industry in the Mediterranean region. (150 words) 10

भूमध्यसागरीय क्षेत्र में उद्यान कृषि और मदिरा उद्योग के विकास हेतु उत्तरदायी कारकों को स्पष्ट कीजिए।

Mediterranean Region is the temperate region where there is sufficient rainfall due to Frontal cyclones. This makes ~~that~~ ^{it} good region for horticulture and wine industry.

Reasons :

- (i) Mediterranean Agro-Climatic zone is pleasant as there is plenty of rain throughout the year due to impact of frontal-cyclones.
- (ii) Temperate Climate is neither too-hot, nor-too cold due to impact of sea and land. There is no fear of heat-wave or frost, which can spoil the citrus crops.
- (iii) Soil has sufficient nutrients as it is alluvial drained by various rivers of Europe and

Northern Africa like Nile.

(iv) The Main Physiography and scientific development of the region is like icing on the cake.

Therefore, due to above agro-climatic conditions, the region is favourable for Citric crops ^{like grapes, figs, olives, etc.} and horticulture, which further promotes the wine industry in France, Italy, Spain, Northern Africa.

6. Bring out the Importance of community-based disaster management in India. (150 words) 10

भारत में समुदाय-आधारित आपदा प्रबंधन के महत्व को स्पष्ट कीजिए।

⇒ It is the community that is first one to face the disaster; so it has great role to play in disaster management, not only in India, but in the world.

⇒ Institutions involved in disaster Management (As recognised by National Disaster Management Act, 2005, Plan-2007, Policy-2017)

are : ① Central Level : NDMA [National Disaster Management Authority]
NDRF
NIDM [National Disaster Response Force]
② State Level : SDMA
SDFR [National Institute for D-M]
③ Community - NGOs
- Individuals.

⇒ SENDAI Framework-2015 recognised the role of Community for Disaster Risk Reduction

⇒ In India, during all the disasters, natural or manmade [cyclones, Earthquakes, Volcanoes, landslides, Bhopal Gas Disaster, Vishapatnam ~~Spill~~ ^{Spill} ~~Leakage~~ ^{Leakage}]

it is the community that first faces the disaster:-

- (i) If community is well-informed prior to the occurrence of disaster, they can rush to safe places [EWS]
- (ii) If community is well-trained to fight against and follow the relief measures, they can help the govt. and become assets rather than liabilities during Disaster Management. [Capacity Building Measures]
- (iii) If community is aware of Disaster Risk Reduction, structures, they can follow such codes while making buildings and houses. Eg: Japan Earthquake resistant houses.

Therefore in all mitigation, preparedness, response and relief measures, community has great role to play. It complements the govt. action and Disaster Management becomes easier & handy. Eg: Role of Community in Uttarakhand Floods, 2014 & Kerala Floods 2018.

7. The concept of ecological footprint is a useful indicator for assessing progress on the sustainable use of resources in a country. Explain.

(150 words) 10

किसी देश में संसाधनों के संधारणीय उपयोग पर हो रही प्रगति का आकलन करने के लिए इकोलॉजिकल फुटप्रिंट की अवधारणा एक उपयोगी संकेतक है। व्याख्या कीजिए।

⇒ Ecological footprint means how much part of ecology has been impacted or used, and quantifying how much can be used more with respect to time for sustainable development and maintaining Intergenerational Equity.

⇒ Ecological Foot prints tell us by quantity how much exploitation of environment has been done.

⇒ we can quantify what is Sustainable limit of Environment

⇒ By calculating above two we can assess the progress of Sustainable Use of Resources.

Example : India has carrying capacity of supply γ tonnes of water, sustainably per person per year

→ If Indian people use less water, ~~by sustainable usage~~ ~~they can~~ and save more water, this will enhance the sustainability of water as a resource.

8. Explaining what peats are, examine why emphasis is being given to sustainable management of peatlands worldwide. (150 words) 10

यह स्पष्ट करने हुए कि पीट क्या हैं, परीक्षण कीजिए कि विश्व भर में पीट-भूमियों के संधारणीय प्रबंधन पर क्यों बल दिया जा रहा है।

Peats are swampy and marshy areas when there is excess of undecomposed dead matter, which decays very slowly. Such areas are found in coastal regions of temperate and sometimes tropical ~~regions~~ areas, dense forests mostly Temperate forests where temperature is low. Eg: Sunderbans, Mediterranean Forests.

Sustainable Management of Peatlands are important for following reasons:-

- ① Biological diversity thrives here. Eg: lichens, fungi, etc. which feed on dead matter
- ② They act as sponges and recharge the groundwater and aquifers
- ③ So, they keep control on floods and reduce such disasters.

→ ① They are storehouse of moisture
~~hence~~ they also play role in
bringing rains and controlling
the surrounding temperature.

The abovementioned Ecological
advantages of Peatlands demand
the world to sustainably manage
the Peatlands. Had Chennai managed
all its Peatlands, it would not
have been facing problem of
Floods and water crisis today.

9. The CRZ Notification, 2018 aims to maintain a balance between economic growth and conservation principles of coastal regions. Discuss.

(150 words) 10

CRZ अधिसूचना, 2018 का उद्देश्य आर्थिक संवृद्धि और नदीय क्षेत्रों के संरक्षण सिद्धांतों के मध्य संतुलन बनाए रखना है। चर्चा कीजिए।

The recent Rules of CRZ, 2018 of Ministry of Environment, Forest and Climate Change are in consonance with various conservation principles of sustainable management like Polluter Pays & Precautionary Principle.

CRZ Rules have divided the Coastal Region into 4 Zones:

① Zone I and IV : Approval of Central Govt. is required. Beaches (up to High Tide and from HTL to 12 nautical miles)

② Zone III and II : Zone 2 is urban area around Coastal Region, where development is allowed but with approval of State Gov.

Zone III is Rural Region - where there are certain No Development Zones

③ 50m from Sea (Population density below 2163 per sq. km)

④ 200m from Sea (Population density below 8163 per sq. km)

In this way above mentioned rules follow precautionary principle by identifying No-Development Zones, and identifying authorities whose approval is required for development in Zone I, II, III, IV.

(3) Recent Judgements of Supreme Court to demolish Morinda Building are truly in line with Polluter Pay Principle and sustainable development on the basis of which Coastal Regulation Zone Rules are made.

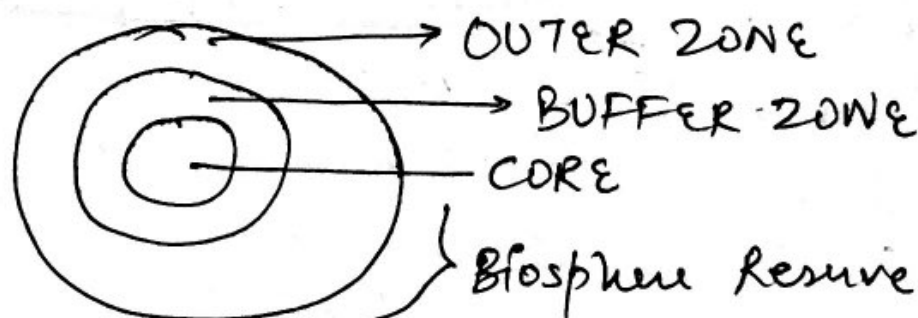
CRZ Rules do not stop the development of coastal areas, but its target is to focus on sustainable development of fragile Coastal Region.

10. Biosphere reserves promote solutions reconciling the conservation of biodiversity and its sustainable use. Discuss. (150 words) 10

जीव मंडल निचय, जैव विविधता संरक्षण और इसके संधारणीय उपयोग के मध्य सामंजस्य स्थापित करने वाले समाधानों को बढ़ावा देने हैं। चर्चा कीजिए।

Biosphere Reserves are the places for conservation of biodiversity which follow the Inclusionary Approach different from exclusionary one followed in National Parks.

They are brought into plan by MAN and BIOSPHERE (MAB) Initiative of UNESCO in 1971, to involve the human beings into biological diversity conservation.



3 Zones of Biosphere Reserve :-

- (1) Core :- Only animals/plants without human interference
- (2) Buffer Zone :- Research work by human allowed.
- (3) Outer Zone :- Humans i.e. Tribal people

and others can carry on sustainable activities in the outer zone like collection of natural leaves, honey, firewood, etc.

In-Situ + Human
Conservation + Activities

Sustainable Use

As biosphere Reserves of the world, along with providing protection to the biodiversity also encourages Sustainable Use of resources from the forest area, they are perfect example of Sustainable Development.

India has 18 biosphere Reserves out of which 11 are recognised by UNESCO, recent one being Kanchenjunga in Sikkim.

11. How does climate change affect the process of desertification?

(250 words) 15

जलवायु परिवर्तन मरुस्थलीकरण की प्रक्रिया को किस प्रकार प्रभावित करता है?

Desertification is worst form of land degradation where the soil loses its fertility and becomes unproductive for the growth of plants and gets converted into Desert. Climate Change has exaggerated the speed of land degradation leading to desertification.

As per recent COP-15, held in Deli under United Nations Convention ~~against~~ on Combating Desertification UNCCD, in India the rate of land degradation is 8000 hectares per year and desertification is its extreme form. This is accentuated by Climate Change.

Climate change involves drastic change in rainfall patterns, heat

temperature, humidity and wind pattern of the earth ~~these~~ over a long period of time. This is affecting desertification in following ways:-

(i) Decrease in Rainfall: The Changing pattern of rainfall in Rajasthan & Sahara and more frequent drought-spells lead to soil-losing its moisture and converting into infertile and barren land.

(2) More-harsh and Strong winds erode the upper layer of soil and desert keeps on getting extended as it is happening in Sahara Region. The soil which lacks moisture is more prone to soil erosion.

(3) Rise in Temperature of earth has led to more evaporation and soil becoming lesser and lesser in humidity content and losing moisture. This lack of water and heat leads to evaporation.

which leads to salinisation of Soil and also ground water.

The Combined effect of rising temperature, decreasing rainfall, reducing humidity and moisture is accelerating the desertification process. All above mentioned are the components of climate change.

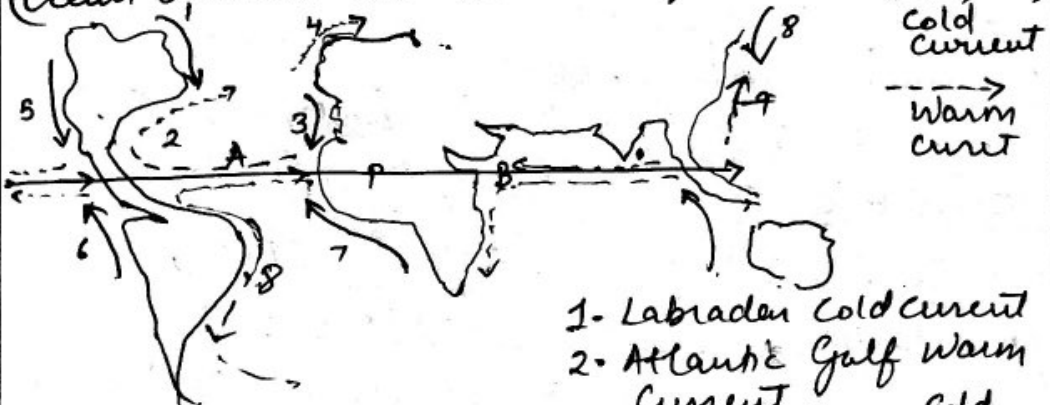
The need of the hour is to stop this process, which is taking away the fertility of productive soils. Sustainable agriculture, Drip irrigation, climate smart agriculture practices, Afforestation, reducing deforestation, Building green cover around desert can bring down the process of desertification. All these are the ways in which climate change and desertification both can be dealt with.

12. What is the global ocean conveyor belt? Discuss its significance for marine ecosystem. (250 words) 15

वैश्विक महासागर कन्वेयर बेल्ट क्या है? समुद्री पारिस्थितिकी तंत्र के लिए इसके महत्व की विवेचना कीजिए।

Global Ocean Conveyor Belt is the process of transfer of heat from surplus regions of Oceans to heat-deficient or cold regions of Ocean through Ocean Currents. This Belt maintains the heat budget of Earth.

Ocean currents are streams of water in Ocean



1. Labrador Cold Current
2. Atlantic Gulf Warm Current
3. North Atlantic Cold Current
5. North Pacific Cold Current
6. Humbolt Current (C)
7. Botswana Current (W)
- A. ~~Equatorial~~ B-Equatorial Current

From the above mentioned diagram, we can conclude that (i) Warm water from Central (Equatorial) Region of Earth is carried along the Eastern Coasts of the continent in tropical regions to Subtropical Regions.

- (ii) Along the ~~Western~~ East of Continents in the tropical region, Cold water from Northern region is carried through Cold Current.
- (iii) Along the Western Coast (in Sub-tropical or Extra-Tropical region) of Continents the Warm water is carried to Poles as Warm Oceanic Current.
- (iv) Along Eastern ~~Coast~~ ^{Continents} in Temperate regions the cold current carries cold water from polar regions.
- (v) Similarly water is flowing in the depth of Oceans in the form of Ocean current (deep water).

These, flowing water streams in Oceans which are called Ocean currents, forms conveyor Belt of Oceans.

Significance of Global Ocean Conveyor Belt for Marine Ecosystem:

- ① They bring cold water from polar regions to South to Equator ^(About 5-10° S-H) and carries warm water from Equatorial region to polar regions.
 It is thus this belt maintains heat budget of Oceans and Earth.

re surplus heat from equator is taken to poles.

② This transfer of heat moderates the temperature of Oceans making them livable for marine life.

③ The places where warm and cold current meets form favourable & breeding grounds for marine life. Eg. Nevada Coast of Canada, Coastal Region of Japan. Here the marine ecosystem is rich in biodiversity.

④ Similarly extreme cold conditions of bottom of Oceans are also moderated by this conveyor belt and hot-tropical regions too get moderated.

In this way this Ocean Conveyor Belt is of great significance for marine ecosystem as it prevents extreme-conditions in Oceans maintain flow of heat energy from surplus to heat-deficient regions of Oceans. This enhances the productivity of marine ecosystem.

13. Identify the important mineral belts of India. Highlighting some of the issues plaguing the mining sector in India, discuss how the National Mineral Policy 2019 aims to address these issues. (250 words) 15

भारत की महत्वपूर्ण खनिज पट्टियों की पहचान कीजिए। भारत में खनन क्षेत्रों को समस्याग्रस्त करने वाले कुछ मुद्दों को रेखांकित करते हुए, चर्चा कीजिए कि राष्ट्रीय खनिज नीति-2019 इन मुद्दों को किस प्रकार संबोधित करने का लक्ष्य रखती है।

Minerals are the boosters of Economy of any region of the world. India has following mineral Belts :-



① Eastern Peninsular India

- It comprises of Odisha, West Bengal, Jharkhand, Chhattisgarh and some parts of Madhya Pradesh.
- Richest belt of Minerals of India (Iron Ore, Manganese ore, Coal are found in abundance).

② Southern Peninsular Belt :- States like Karnataka, Goa, Tamil Nadu, Andhra Pradesh and Telangana. Rich in Iron Ore; Manganese. Kerala is rich in manganese & nickel. Neyveli; Coal (Tamil Nadu)

③ Western Peninsular India :- Comprises of Rajasthan, Gujarat & Maharashtra. Rich in Zinc, Bauxite, Petroleum-ores, etc.

④ North Eastern India :- has Petroleum Reserve in Digboi Assam and tertiary Coal deposits in Meghalaya & Assam.

Issues Plaguing Mining Sector in India :-

(i) Auctions and Acreage System

① The Auction of mines ~~are~~ not transparent

② Auction is delayed and happens after no-fixed intervals.

③ Acreage of mines do not give freedom to mines to explore new sites. They have to stick to just auctioned number of mines.

(ii) Half-hearted Private Sector Entry :

The Private sector was not allowed to freely use and sell the products out of mining areas. They could only use it for their own factories production purposes.

(iii) Ecological Impacts and EIA :

① Mining affects the environment so proper Environment Impact

② Assessment must be done as per rules. Fragile environments should be exempted from mining.

③ Abandoned mines are not being afforested

The National Mineral Policy, 2019 :

- 1) It has made the Auctioning Process more transparent and should be done after frequent intervals with timely notices.
- 2) It has enhanced the acreage of the miners by letting them explore the areas and giving them priority over newly discovered mines in the given portion of auctioned site.
- 3) The Private sector can now sell the mined products ^{in market}, rather than compulsory sale to government or self-usage.
- 4) Compulsory afforestation of the abandoned mining sites.
- 5) Proper precautions to be taken by the workers working in mine.
- 6) New Technology under Transfer of Technology Clause.

In this way fully opening mine to private sector along with proper Environment Safety Guard are steps towards SDGs.

14. Not only is the spatial and temporal distribution of freshwater in India very skewed, but also its usage inefficient and wasteful. Discuss in context of the current water crisis.

(250 words) 15

भारत में ताजे जल का स्थानिक और सामयिक वितरण न केवल अत्यधिक विषम है, अपितु इसका उपयोग भी अकुशल एवं अपव्ययी है। वर्तमान जल संकट के संदर्भ में चर्चा कीजिए।

Water Crisis is being faced by Country where there is no sufficient water to meet the demands of the day.

The availability of water is declining and demand for water is rising due to increased population and enhanced economic activities.

Reasons for current Water Crisis:

① Spatial Distribution of Water is Uneven: ① Northern Plains have Perennial rivers, southern India has Ephemeral rivers which dry in winter.

② Rajasthan Marusthali has very few sources of freshwater and declining underground water.

③ Temporal Distribution: Rainfall is one of the major sources of Rain for drinking, crops, agriculture & allied activities. Rainfall is abundant only during monsoon season.

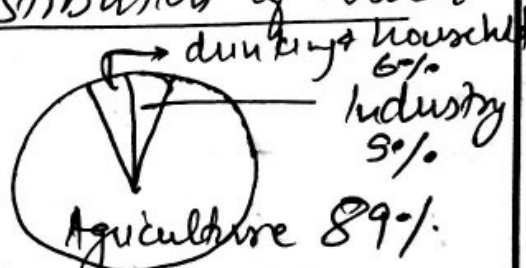
Rest of ~~the~~ seasons lack rains
the country.

① Only Northern India and Tamil
Nadu receive winter rainfall.

② Ocean water is not drinkable
and India cannot afford desalination
of water at current times.

④ Inefficient Distribution of Water
Usage Patterns

⇒ Approximately 80%
of water is used
for agricultural purposes.



⇒ But water used for Agriculture is
not used efficiently

→ North semi arid - India, deficient
in rains grow water-intensive
crop re Paddy.

→ Irrigation system is stewell.
Open canals loose most of
water by evaporation. Only
40% of this water is used ~~for~~
agricultural fields.

→ Excess usage of fertilisers require
more and more water as this
water easily seeps into ground

↳ No means of collecting water during rainy seasons.

Industrial sector - pollutes the water by discharging the pollutants without treating the water.

Even at home, the casual and irresponsible attitude towards water which includes, running shower baths, overflowing water-tanks, car washing, etc. wastes lot of drinkable water.

So, not only: natural water distribution but Insufficient Water Usage has aggravated the Water Crisis in India.

Chennai draughts and floods occur as trough and crest in last few years is shocking outcome of combined Climate Change and anthropogenic destruction of Water Reservoirs of Nature.

The Panacea to Water Crisis is
Rainwater Harvesting, Drip Irrigation,
Climate-smart Agriculture, Behavioural
Changes and judicious Use of Water.
Interlinking of rivers requires lot of ground research work.

15. What is Soil Organic Carbon (SOC)? Identify various factors affecting SOC levels. Also, highlight the beneficial impacts of SOC on soil health and functionality. (250 words) 15

मृदा जैविक कार्बन (SOC) क्या है? SOC के स्तर को प्रभावित करने वाले विभिन्न कारकों की पहचान कीजिए। साथ ही, मृदा स्वास्थ्य और कार्यात्मकता पर SOC के लाभकारी प्रभावों पर प्रकाश डालिए।

Soil Organic Carbon is the humus content of the soil which is made up of dead and decaying matter. It adds nutrients to the soil and makes it more productive

Various factors affecting SOC:

- ① → Temperature: (High temperature reduces the humus content and cold temperature makes the soil more peaty.)
- ② → Humidity: More humidity in soil, more will be the SOC as water retained in soil promotes efficient death and decay of organic matter.
- ③ → Bacteria Content: More the microorganisms in soil, more will be the SOC.

④ Use of Chemicals : Lesser chemical usage, means more SOC. More chemicals kill the microorganisms and earthworms (called farmer's friend)

⑤ Water logging & Soil Salinization decreases the SOC as it either leaches into ground water or evaporation leads to salinity and alkalinity of soil

Benefits of SOC on Soil Health and functionality:-

- ① SOC makes soil rich in micro and macro-nutrients like N, P, K, Ca, etc.
- ② SOC helps and invites more biodiversity and microorganisms to thrive in the soil, which enhances the humus content
- ③ Lesser Usage of Artificial Fertilisers and Chemicals is required.

(25)
opt

④ More the SOC content, more will be the productivity of Soil, more will be the growth and productivity of crops.

⑤ Water content in soil is maintained for longer time with SOC so lesser frequent irrigation is required.

⑥ More SOC, ~~lesser~~ use of chemicals and human health hazards are reduced. ~~Lesser~~ Agricultural run-off. Lesser chances of water pollution & eutrophication.

In this way SOC adds productivity to the Soil & Agricultural Economy.

16. Discuss the increasing need of 'disaster resilient infrastructure' in India. Mention the steps taken in this direction with specific reference to the Global Coalition for Disaster-Resilient Infrastructure. (250 words) 15

भारत में 'आपदा-प्रत्यास्थ अवसंरचना' की बढ़ती आवश्यकता पर चर्चा कीजिए। ग्लोबल कोएलिशन फॉर डिजास्टर-रेजिलिएंट इन्फ्रास्ट्रक्चर के विशेष संदर्भ में इस दिशा में उठाए गए कदमों का उल्लेख कीजिए।

Disaster Resilient Infrastructure means the building, roads, houses, and other Infrastructure that can witstand the impacts of disaster ~~without~~ causing lesser harm to property and human lives.

It is important ~~for~~ India because India has such a diverse physiography which is prone to frequent natural and anthropogenic disasters.

For (1) Coastal Areas faces Threat of Cyclones

(2) Himalayan Region or Seismic Zone V & IV is under threat of Earthquakes and landslides. Bellu is too under Seismic zone

(3) North Eastern India due to rivers and topography faces certain spans of floods.

- ④ Monsoon Rains bring frequent lightening all over the country.
- ⑤ Slum Areas are congested - so pandemic is not a new kind of disaster.
- ⑥ Unplanned Urban Expansion has created Urban heat Islands and Urban floods is another disaster (eg. Mumbai, Chennai).
- ⑦ Climate change and more than 55% agriculture dependent on agriculture is prone to droughts and famines consequently.

India in 2019 at UN Climate Change Conference at New York has along with few other countries has ~~decide~~ announced its initiative of Global Coalition for Disaster-Resilient Infrastructure.

- ① It is following SENDAI framework 2015
- ② Involvement of all nations at international level to share knowledge

Regarding Disaster Resilient Infrastructure Development for new Technology & sharing at Global level. for Disaster Risk Reduction.

⇒ India has launched National Disaster Management Plan and Policy in 2007 and 2019 respectively. under Disaster Management Act, 2005.

⇒ It involves working of different States and NGOs along with Centre to fight against Disaster.

⇒ Beel - Bridge in Assam is Disaster Resilient Bridge. So are recent constructed bridges in Ladakh.

⇒ NIDM = National Institute of Disaster Management under Home-Ministry has undertaken Research and development projects for D.R. Structures.

Disaster Resilience in Structure will safeguard Indian Economy and lives from the threat of Disasters.

17. Give an account of the natural and man-made causes of forest fires. Highlighting the challenges associated with forest fire management in India, mention the different components of the National Action Plan on Forest Fire. (250 words) 15

दावानल के प्राकृतिक एवं मानव जनित कारणों का विवरण प्रस्तुत कीजिए। भारत में दावानल प्रबंधन से संबद्ध चुनौतियों पर प्रकाश डालते हुए, दावानल पर राष्ट्रीय कार्य योजना के विभिन्न घटकों का उल्लेख कीजिए।

Forest fires of Amazon Forest and Australian Forest are the greatest disasters that have affected the mankind.

Natural Causes

- Increasing temperature due to global warming
- Late/Delay in Rainfalls as happened in Australia
- Reducing Humidity Content in the Environment due to global warming and Climate Change

Man made Causes

- ↳ Slash & Burn Agriculture [Brazil]
- ↳ Tourist fire-places and their neglect to put them off.
- ↳ Debrute Clearance for expansion of grazing ground, agriculture and industry. (Alleged Case in Brazil)

↳ Deforestation, which just exposes the dry grass to forest fires.

Challenges: ① Forest fires are difficult to shut-off as the vast expanses of forests have huge potential organic fuel which keeps on expanding

② India does not have well maintained Infrastructure of Fire Brigades to deal with Forest fires. India already facing water crisis

③ India has large grassland that surrounds deciduous forest which is more prone to forest fires.

National Action Plan on Forest

Fires: This is created by National Disaster Management Authority.

Stateholders are: Forest Department, NDRF, SDRF Team, Community

All the stakeholders to follow well designed plan and Co-ordinates

① Warning system

② Mapping of areas under threat of Forest fires

③ Capacity Building to Train NRRP & SDRF for Rescue Operation

④ Wild Life Protection Team.

⑤ Community Training for Evacuation and fighting purposes.

⑥ Strategy of Clearing a line of trees for creating a divide to prevent expansion of forests is one of the major strategy.

So there are procedural and institutional ways to deal with Forest fires as per the Plan.

18. What is carbon pricing? Mention some of the different types of carbon pricing mechanisms. Examine how it can help India in achieving its climate commitments under the Paris Agreement. (250 words) 15

कार्बन मूल्य निर्धारण क्या है? विभिन्न प्रकार की कार्बन मूल्य निर्धारण क्रियाविधियों का उल्लेख कीजिए। परीक्षण कीजिए कि यह पेरिस समझौते के अंतर्गत अपनी जलवायु प्रतिबद्धताओं को प्राप्त करने में भारत की किस प्रकार सहायता कर सकता है।

Carbon Pricing developed under Kyoto Protocol, 1997.

The Carbon Credit can be traded at international level under it.

Carbon Credit = 1 Million Tonne of CO_2

The States which create such capacity that it decreases CO_2 emission & reduces carbon footprints, it is given Carbon credits which are priced and sold to developed ~~and~~ and developing nation.

- By this the country earns through Green Economy.
- The developed countries can buy the credits for developmental purposes & ensuring sustainable development.

As per Paris Agreement -
India has decided its NDC,
Nationally Determined Contribution
me to reduce CO₂ emission
by 33% to 35% from 2003 level
by 2030.

This target can be achieved
through Carbon Pricing:-

- ① Creating Afforested Areas. and
earning the Carbon Credits &
sell them in International Market
- ② Tapping Renewable sources of Solar
Energy, wind energy: can help India
gain Carbon Credits & reduce
Carbon Emissions
- ③ India can even buy Carbon
Credits from developed countries
to earn ~~Carbon~~ developmental
opportunities at sustained level.

There are dual benefits of
Carbon Pricing: ① Saving Environment
by reducing Emissions.

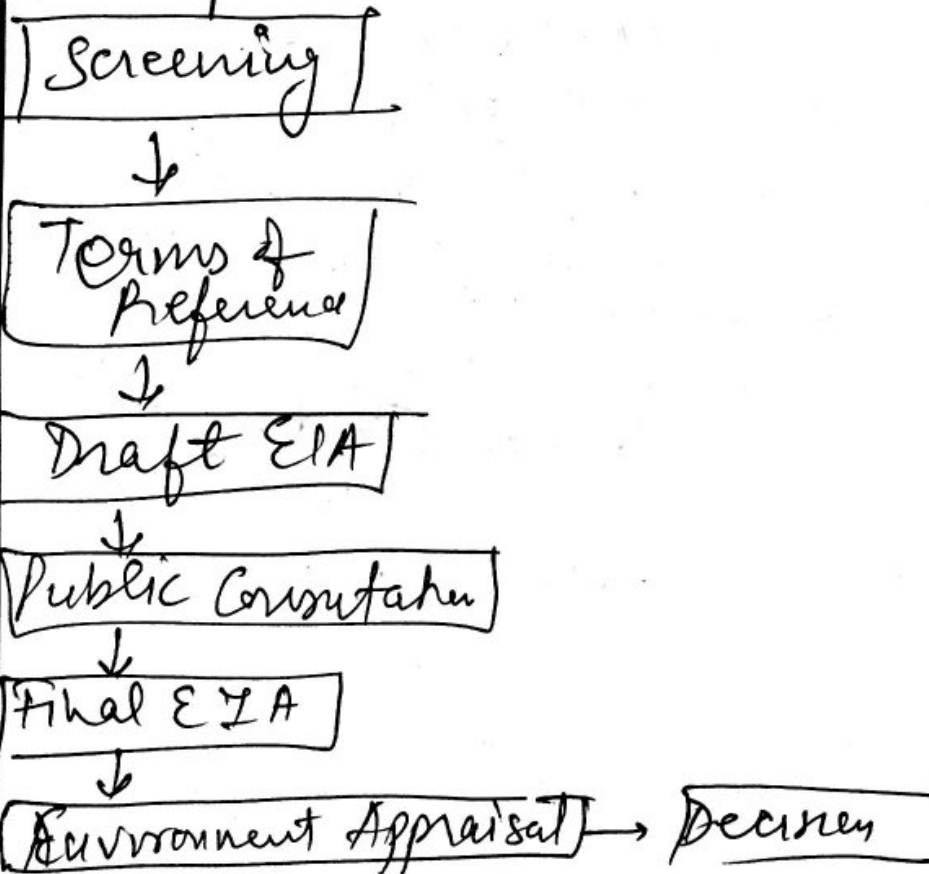
- ② Earning money by selling Or
Credit in International market
- ⑤ It helps in achieving NDC &
SDGs.

19. What are various phases of Environmental Impact Assessment (EIA) studies? Comment on the need for institutionalising public participation in EIA. (250 words) 15

पर्यावरणीय प्रभाव आकलन (EIA) अध्ययन के विभिन्न चरण क्या हैं? EIA में जन भागीदारी को संस्थागत बनाने की आवश्यकता पर टिप्पणी कीजिए।

EIA, Notification 2006 has various elaborated steps for Environment Impact Assessment. It is a process in which the impact on Environment is measured with respect to the Proposed developmental Project.

The steps involved in EIA are :



- ① Screening involves whether the project demands EIA. (If in Category A or B1, EIA is required).
- ② Terms of Reference are assigned to Independent Assessment Committee its ambit is decided.
- ③ After various Researches, EIA Committee comes up with Draft EIA Report
- ④ Public Consultation with 30 days Answering Queries of Public
- ⑤ On above basis EIA final report is made and ^{sent for} approval of Appraisal Committee, which ~~sends~~ the report to Ministry or concerned state department which decides.
- ⑥ Later on Biennial Monitoring Report are to be submitted ^{twice} (every year).

Public Hearing is of utmost importance as the project might affect the public in many ways. It might impact their Right to life, Right to livelihood and Right to Clean

and healthy environment.

Therefore, they must be made
part of EIA.

EIA, when public is involved,
makes it more authentic and
taking Public Opinion will
lead to improvement in
the project and reducing the
environment harm.

This also enhances participatory
democracy in development. So
institutionalizing public hearing
is of utmost importance.

Govt. must rethink upon its
proposal to amend the EIA
Notification to reduce the
days for public hearing from
30 to 20. ~~This will lead~~

Efficient public hearing
enhances Trust-Building as
Government and its developmental
model.

20. Ecosystem services are the direct and indirect contributions of ecosystems to human well-being. In this context, distinguish between supporting, provisioning, regulating and cultural services provided by ecosystems.

(250 words) 15

पारिस्थितिकी तंत्र सेवाएँ मानव कल्याण हेतु पारिस्थितिकी तंत्र के प्रत्यक्ष एवं अप्रत्यक्ष योगदान के रूप में हैं। इस संदर्भ में, पारिस्थितिकी तंत्र द्वारा प्रदान की जाने वाली सहायक (supporting), प्रावधानन (provisioning), विनियामक (regulating) और सांस्कृतिक (cultural) सेवाओं के मध्य अंतर स्पष्ट कीजिए।

Ecosystem is the interaction of biosphere, lithosphere, atmosphere and hydrosphere, which along with biodiversity provides various ecosystem services to humans which are :-

① Provisioning : It provides timber, meat, bamboo, medicinal plants, rubber, aesthetic beauty and food, livelihood to hunter-gatherers and different animals and plants which source of biodiversity

② Supporting : Forest support the water cycle, Nitrogen cycle, Carbon cycle and various other biogeochemical process which enriches nutrients

~~Forest~~ - They support economy
and livelihood of people of
Country.

③ Regulating ① Forest regulate
the flow of energy by
maintaining balance between
different trophic levels in
the energy flow and Food
web and Food Chain

② Forest regulate the rains and
prevent floods.

③ They regulate supply of O₂
and take in CO₂ and
regulate their supply for
sustainable living.

④ Cultural Services : Various
festivals and recreational
activities are performed in the
ecosystem like - Chhatt Puja,
worshipping forces of Nature.
- The Culture of Tourism is again

promoted as people to explore
nature for aesthetic purposes.

⇒ In this way Ecosystem provides
us with various services and
maintains the life support
system on Earth.