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GENERAL STUDIES (TEST CODE : 1051)

Name of Candidate	Chahat Bajpai		
Medium Eng./Hindi	English	Registration Number	22842
Center	Distance	Date	04/09/18

INDEX TABLE			INSTRUCTIONS
Q. No.	Maximum Marks	Marks Obtained	
1	10		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	10		2. There are TWENTY questions printed in ENGLISH & HINDI इसमें बीस प्रश्न हैं अंग्रेजी और हिन्दी में छपे हैं।
3	10		3. All questions are compulsory. सभी प्रश्न अनिवार्य हैं।
4	10		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	10		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 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।
6	10		6. Word limit in questions, if specified, should be adhered to. प्रश्नों में शब्द सीमा, जहाँ विनिर्दिष्ट है, का अनुसरण किया जाना चाहिए।
7	10		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।
8	10		
9	10		
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16	15		
17	15		
18	15		
19	15		
20	15		
Total Marks Obtained:			
Remarks:			

16-B, 2nd Floor, Above National Trust Building, Bada Bazar Marg, Old Rajinder Nagar, Delhi-110060

M-1/4, Plot No-A-12/13, 1st Floor, Ansal Building, Dr. Vidya Sagar Homoeopathic Clinic, Mukherjee Nagar, Delhi-110009

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.

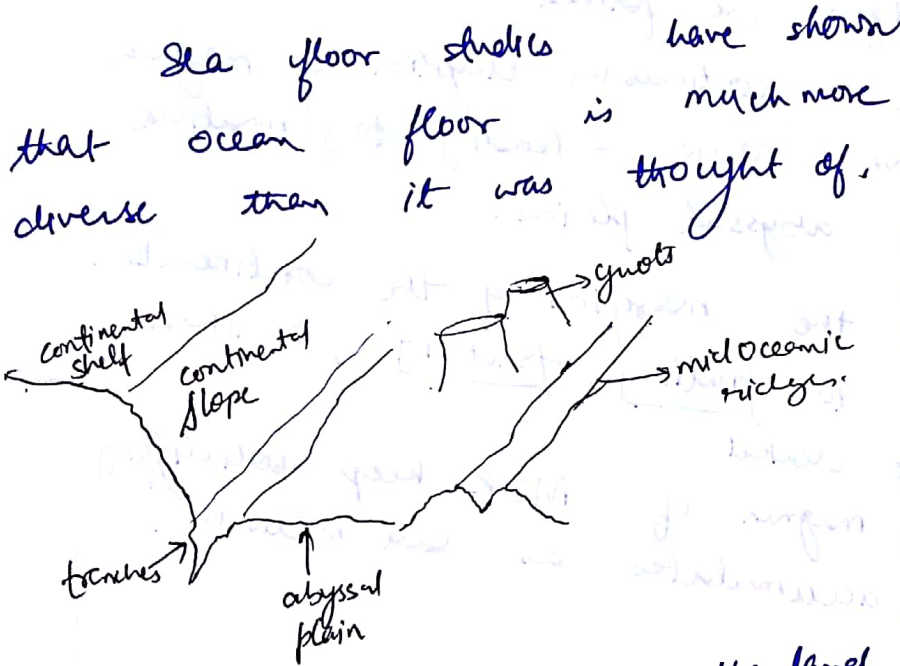
5.

6.

All the Best

1. The mapping of ocean floor reveals complex and varied features, which rival the relief features on land. Discuss the reasons for the formation of main relief features of ocean along with their significance. (150 words) 10

महासागरीय अधस्तल के मानचित्रण से जटिल और विविध आकृतियों का पता चलता है, जो स्थलीय उच्चावचीय आकृतियों के तुल्य हैं। महासागरों की मुख्य उच्चावच आकृतियों के निर्माण के कारणों तथा उनके महत्व की चर्चा कीजिए।



like fold mountains on the land, they are sea mounts called seamounts under water. Also like the flat terrains like plains, grasslands, there are abyssal plains on the ocean floor. There are also deep valleys called trenches.

REASONS for FORMATIONS :

1. Plate tectonics - due to divergence of ocean-ocean plates, midoceanic ridges are formed.
2. There is continuous eruption of magma from MOR - leading to formation of abyssal plains.
3. At the margins of the continents due to faulting, fracturing, trenches are created.
4. As magma of MOR keep solidifying it accumulates as sea mounts.

SIGNIFICANCE

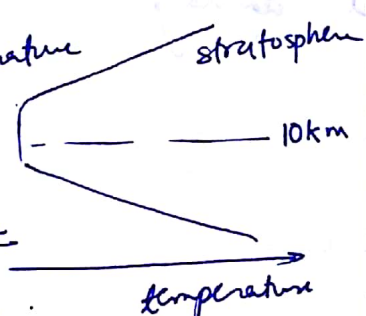
1. Continental shelf - has huge resources of fishery, petroleum
2. Island formation - when sea mounts rise on surface
3. formation of new layer of ocean crust bring several minerals like poly metallic nodules on ocean floor.

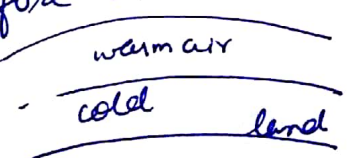
2. What is inversion of temperature? Discuss the various mechanisms of occurrence of this phenomenon along with its climatic and economic significance. (150 words) 10

तापमान व्युत्क्रमण क्या है? इसके जलवायविक और आर्थिक महत्व के साथ इस परिघटना के घटित होने से संबंधित विभिन्न क्रियाविधियों पर चर्चा कीजिए।

With rise of altitude, the temperature of atmosphere usually declines (at around $6.5^{\circ}\text{C}/\text{km}$). ~~How~~ As heating occurs primarily due to long wave length radiations from earth. However at times this trend is violated and temperature start rising. This is called temperature inversion.

MECHANISMS

1. At tropopause : temperature is constant to slight increasing. This is due to presence of ozone which leads to heating. 

2. On a cold winter night. — land cools and therefore air near it cools. 

3.

Valley inversion.

At night the cold air from hill top descends to valley



IMPLICATIONS

Climatic — descent of cold air creates any anti-cyclonic, high pressure or stable condition. This prevents rain

Economic : coming of cold air down the valley slope can create frost and damage the crops.

3. With rapid industrialization, the threat of industrial disasters has increased. Explain the meaning of industrial disaster with adequate examples. Also, highlight the legal and institutional framework to reduce the risk during such events. (150 words) 10

तीव्र औद्योगीकरण के साथ, औद्योगिक आपदाओं का खतरा बढ़ गया है। यथोचित उदाहरण देते हुए औद्योगिक आपदा के अर्थ की व्याख्या कीजिए। साथ ही, ऐसी घटनाओं के दौरान जोखिम को कम करने के लिए कानूनी और संस्थागत ढांचे पर भी प्रकाश डालिए।

Industrial disaster is a man-made disaster that occurs due to any

of following events -

1. Leakage of harmful gases like methane isocyanide in Bhopal gas tragedy 1984
 2. Leakage of radioactive substance like in Chernobyl and Fukushima
 3. Health hazards to workers like silicosis in mining industry
 4. Leakage of chemicals like oil spills on ennore port in 2017
- These are termed as disasters due to their harmful long term consequences.

1. Environment - chemicals settle in air, water, land and remain undecomposed for long term.

2. Society - usually is unprepared how to respond to crises.
3. Health hazards - like genetic defects in case of nuclear disasters

LEGAL - INSTITUTIONAL MEASURES

1. Factories Act 1948, Environment protection act 1986 provide necessary guidelines.
 2. NDRF has a special battalion to deal with chemical, nuclear disasters
 3. DPSP also mandate the government to provide safe environment
- However at times they are neglected by the factory owners to save cost. Therefore there is need for regular inspections, regulations in order to achieve sustainable development goals

4. What are 'dead zones'? Mention the reasons for their formation. Explain, in brief, the impact of such dead zones. (150 words) 10

'मृत क्षेत्र' (डेड जोन) क्या हैं? इनके निर्माण के कारणों का उल्लेख कीजिए। ऐसे मृत क्षेत्रों के प्रभाव की संक्षेप में व्याख्या कीजिए।

'Dead zones' are the regions in the ocean that are no longer capable to support animal and plant-diversity. Last year, a NASA report revealed formation of a major dead zone in Bay of Bengal.

REASONS for formation

1. Eutrophication or nutrient enrichment due to flow of agricultural fertilizers, industrial chemicals, untreated MSW into the oceans.
2. Oil spills like an Ennore port in 2017 can create conditions where sunlight is not able to reach ocean surface and oxygen level also reduces.

3. Illegal, unregulated and unreported fishing at unsustainable levels like using deep sea trawling.
 4. Climate change, increased UV penetration due to ozone hole.
- IMPACT OF DEAD ZONES

1. Decline of biodiversity - phytoplankton population cannot survive which form basis of food chain.
2. Coral bleaching - ecological implication
3. Economic impact - decline in fish catch.
4. Impact on tourism like cruise tourism.

Overall it raises question on nature of development and thus legitimacy of governance policies, as it compromises interest of future generation.

5. Stating the differences between deltas and alluvial fans, highlight the factors responsible for their formation. Also, briefly bring out the economic importance of these two depositional landform types. (150 words) 10

डेल्टा और जलोढ़ पंख के मध्य अंतर बताते हुए, उनके निर्माण के लिए उत्तरदायी कारकों पर प्रकाश डालिए। साथ ही, इन दो निक्षेपात्मक भू-आकृतिक प्रकारों के आर्थिक महत्व को भी संक्षेप में बताइए।

Deltas and alluvial fans are ~~the~~ both depositional features however they differ significantly.

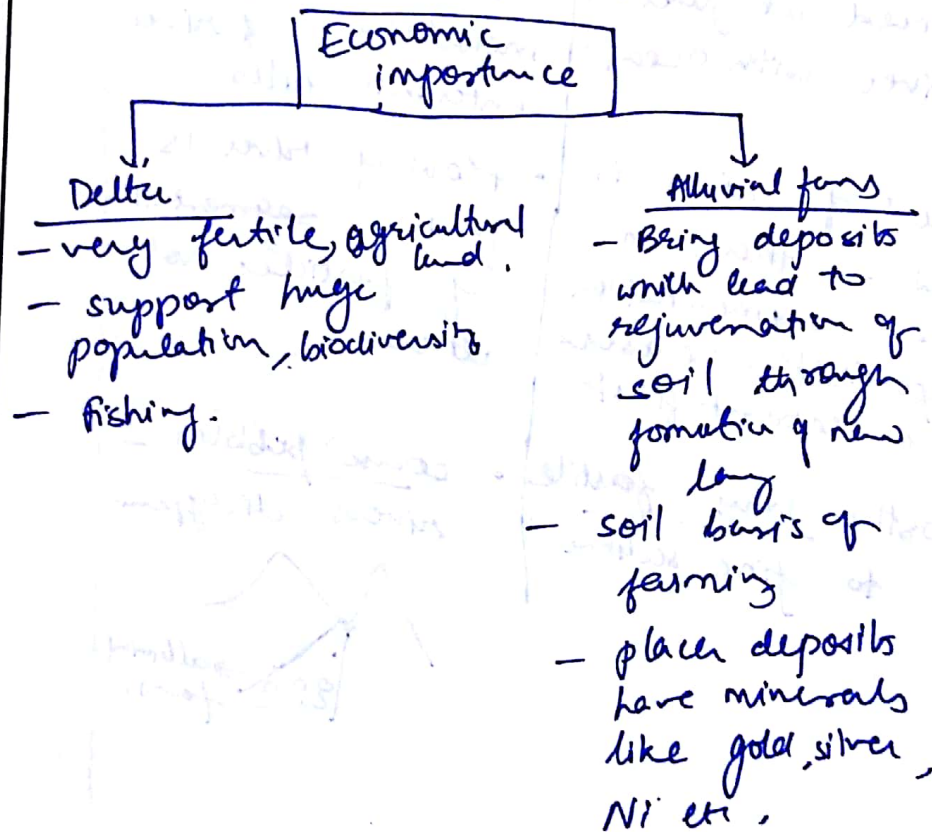
Deltas	Alluvial fans
- Formed at junction of river with ocean - Flow of river is slow - there is clear segmentation of particles - coarser ones deposit first - mostly <u>very</u> fertile due to fine silt	- formed at foot of mountains as if river enters into hills. - Flow of river is fast - segmentation of particles not there. <u>coarse</u> pebbles - rivers disappear.



factors for formation

Delta - At the end of course river carry huge sediments, and its speed is slowed due to flat terrain.

Alluvial fans - as river emerges from mountainous terrain, it contains sediments which deposit at foothills.



6. What do you understand by Inter Tropical Convergence Zone (ITCZ)? Discuss the annual fluctuations and shifting of ITCZ belt and its significance for India. (150 words) 10

अंतः उष्ण कटिबंधीय अभिसरण क्षेत्र (ITCZ) से आप क्या समझते हैं? ITCZ पट्टी के वार्षिक परिवर्तन और स्थानांतरण एवं भारत के लिए इसके महत्व पर चर्चा कीजिए।

ITCZ is a zone of low pressure area around equatorial region. It is formed due to excessive heating of this region due to solar insolation thus creating low pressure condition.

ANNUAL FLUCTUATIONS



During month of July when sun apparently moves in Northern Hemisphere, ITCZ shifts upwards while in January when sun moves into southern hemisphere it moves downwards.

This happens because —

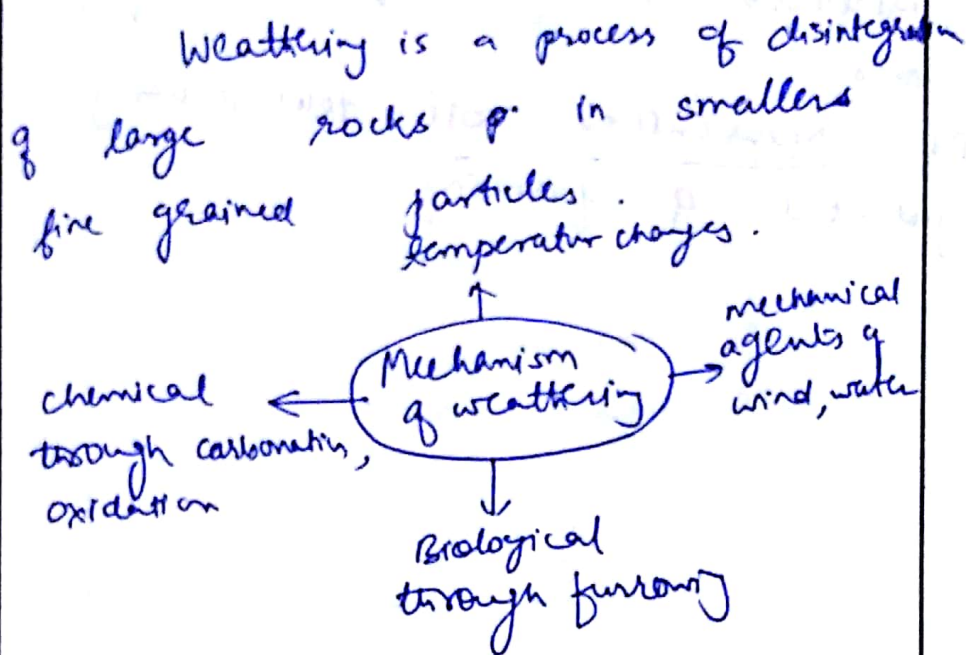
heating due to solar radiation → warm air rises → low pressure condition

Significance for India

1. Movement of ITCZ into India during July attracts monsoon winds. Blowing from ocean to land they carry huge moisture and bring rain.

7. What is weathering? Discuss the ecological and economic significance of the process. (150 words) 10

अपक्षय क्या है? इस प्रक्रिया के पारिस्थितिकीय और आर्थिक महत्व पर चर्चा कीजिए।



Ecological significance :

1. It leads to formation of regolith which forms the basis of soil.
2. It provides substratum to support wide range of microscopic as well as large ~~fla~~ flora and fauna.

Economic significance

1. It leads to concentration of minerals leading to formation of ores.
2. It rejuvenates soil thus increasing potential of farming.

8. Explain the concept of Sun-spot cycle. In view of the approaching Solar minimum, highlight the changes that it brings on sun's surface and the effects that it has on earth. (150 words) 10

सौर कलंक चक्र की अवधारणा की व्याख्या कीजिए। आसन्न सोलर मिनिमम के परिप्रेक्ष्य में, सूर्य की सतह पर उत्पन्न होने वाले परिवर्तनों और इसके द्वारा पृथ्वी पर पड़ने वाले प्रभावों पर प्रकाश डालिए।

Sun spots are the location
on the sun surface which
are much cooler than surrounding
area. They are formed as the
solar insolation keeps changing.

changes on sun's surface

Temperature of sun's corona is
much higher than inner layers.
However formation of sun spot
reduces temperature by upto
1000's of degree celcius.

The reasons for its formation
are not clearly known. However
several studies like Aditya L1 of
ISRO have been launched to study it.

Effect on earth :

change in insolation of is
a major & reason behind changes
in climate patterns.

- Ice ages occurred during solar minimum.
- prolonged sun spots can help naturally revert present climate change event.

9. What is Pacific Ocean Garbage Patch? Provide an account for the factors responsible for its development and location. Also, discuss its impacts and suggest measures for mitigation. (150 words) 10

पैसिफिक ओशन गार्बेज पैच क्या है? इसके विकास एवं अवस्थिति के लिए उत्तरदायी कारकों का विवरण प्रस्तुत कीजिए। साथ ही, इसके प्रभावों पर चर्चा कीजिए और शमन के उपाय भी सुझाइए।

Pacific ocean garbage patch is a term that is referred to increasing solid waste especially plastic, metal cans in the pacific ocean. They are found upto as deep locations as Mariana trench.

Factors responsible

1. Increased use of plastics which are non-biodegradable
2. Unscientific waste disposal
3. Oil spills
4. flow of rivers into oceans - which carry all untreated waste.

Impact

On biodiversity - threatened,
a study found plastic accumulation
in fish

On humans - consumption of seafood
can become unsafe.

10. Explain the formation of mid-oceanic ridges in different oceanic basins of the world. (150 words) 10

विश्व के विभिन्न महासागरीय नितलों में मध्य महासागरीय कटकों के निर्माण की व्याख्या कीजिए।

Mid oceanic ridges are formed at the junction of diverging ocean-ocean plates.

Location :



MOR extends mainly in the middle of Atlantic ocean - as it lies at junction of North American and South American plates on one side and Eurasian

and African plates on the other

In Pacific ocean they are
formed due to presence of numerous
minor plates on eastern coast like
Cocos, Juan De Fuca etc.

11. Discuss the spatial and temporal variation of rainfall in India. Has this pattern been changing in recent years? Examine. (250 words) 15

भारत में वर्षा की स्थानिक और कालिक भिन्नता पर चर्चा कीजिए। क्या हाल के वर्षों में यह पैटर्न परिवर्तित होता रहा है? परीक्षण कीजिए।

India has monsoon type
of climate with almost 80% rain
confined in 3-4 months

SPATIAL VARIATION



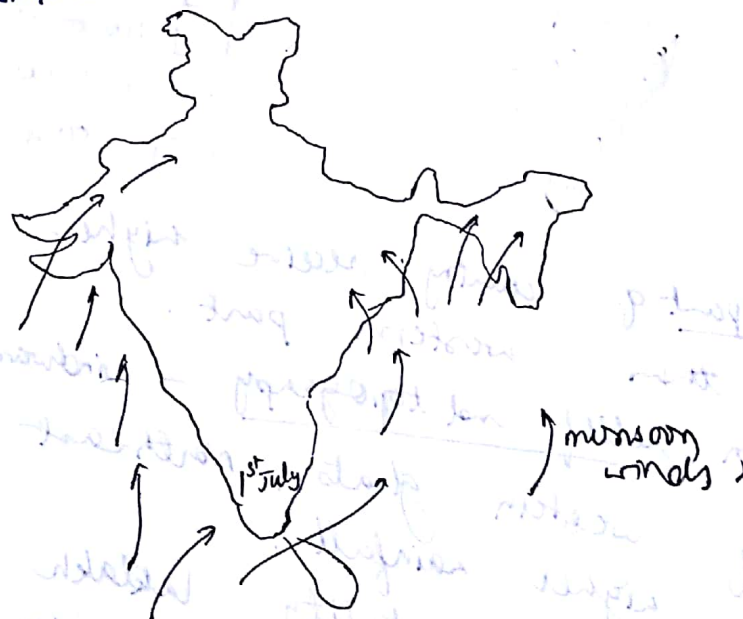
	> 200 cm
	100 to 200 cm
	50 to 100 cm
	< 50 cm

1. Eastern part of country receive higher rain than western part.
2. Based on relief and topography - windward side of western ghats, northeast receive higher rainfall.
3. Based on continentality - Ladakh region, central India - Vidarbha (MH)

Bundelkhand lesser rainfall.

TEMPORAL VARIATION

1. Most parts of the country receive rainfall in monsoon season from July to October.
2. Tamil Nadu coast receive rainfall due to northeast monsoon in early winter in November.
3. Northwestern parts also receive rain from western disturbance in winters.



Thus rain proceeds from coast to interior with time.
Overall average rainfall = 125cm
CHANGING PATTERN

In recent years the pattern has seen witnessing changes like increased frequency of extreme weather events like Chennai floods 2015, new Kerala floods etc.

Reasons

- | <u>Natural</u> | <u>Anthropogenic</u> |
|--|---|
| <ul style="list-style-type: none"> • El Nino events • shifting pressure belts • changing insolation | <ul style="list-style-type: none"> • climate change • Increasing GHGs - melting of glaciers • overutilisation / mismanagement of resources |

Implications: more regions witnessing droughts, floods etc. leading to agrarian distress.

Indian with 95% population involved in agriculture is heavily reliant on monsoon. Therefore, there is need to minimise ecological footprint of human action.

12. Technology has provided important tools for making disaster management more effective. Elaborate with special focus on the role of technology in reducing disaster risk. Also highlight the challenges in application of technological solutions in disaster affected areas. (250 words) 15

आपदा प्रबंधन को अधिक प्रभावी बनाने हेतु प्रौद्योगिकी ने महत्वपूर्ण साधन प्रदान किए हैं। आपदा जोखिम न्यूनीकरण में प्रौद्योगिकी की भूमिका पर विशेष ध्यान केंद्रित करते हुए सविस्तार वर्णन कीजिए। साथ ही, आपदा प्रभावित क्षेत्रों में तकनीकी समाधानों के अनुप्रयोग में आने वाली चुनौतियों पर भी प्रकाश डालिए।

Disaster management is a process of building community preparedness, doing hazard and vulnerability mapping to minimise risk of hazard. At the same time, setting up institutional mechanism to respond, recover and rehabilitate from disasters.

Technology has potential to make each of these processes more effective.

ROLE OF TECHNOLOGY :

PRE DISASTER

1. Preparedness
Hazard and vulnerability mapping - more precisely through use of big data analytics.

2. Early warning system - like INCOIS has set up high frequency radars, coastal surveillance systems to detect Tsunami in 10 minutes.
3. Tracking exact nature of hazard - can significantly reduce damage like through satellite imagery we were able to track 2013 cyclone Phailin on coast of Odisha very precisely to avoid fate of 1999 super cyclone.

DURING DISASTER

1. Information dissemination - like about precautionary measures, safe places, risk of epidemics (after floods) etc using mobile applications.
2. To mark oneself safe - to inform near and dear one's - a feature social media introduced after 2015 Nepal earthquake.

3. To coordinate NGOs, local bodies etc in aid supply chain management-

POST DISASTER

in recovery, rehabilitation and reconstruction.

1. Studying impact of disaster through drones, including the lessons learnt in future planning.

CHALLENGES

1. Breakdown of electricity, internet connection during disasters - but they can be made robust through underground cables.
2. Most vulnerable like poor, old, women usually have least access to technological solutions.
3. High cost and also need for training to use them.

Overall digital solutions are only additional benefit, ground level preparation through mock drills, trained forces and other structural and non structural solutions needs to be done.

13. While overcrowding in public places cannot be wished away in India, what we need are better infrastructure and more effective crowd-control measures. Comment. Also, briefly enumerate NDMA guidelines for crowd management. (250 words) 15

यद्यपि भारत में सार्वजनिक स्थलों पर अत्यधिक भीड़भाड़ को कम नहीं किया जा सकता है, तथापि हमें बेहतर अवसंरचना और अधिक प्रभावी भीड़-नियंत्रण उपायों की आवश्यकता है। टिप्पणी कीजिए। साथ ही, भीड़ प्रबंधन के लिए NDMA के दिशानिर्देशों को संक्षेप में सूचीबद्ध कीजिए।

Kumbh festivals occurring once in 12 years see footfalls of crores of people every day. Infact many other socio-religious ceremonies witness huge crowds.

Lack of effective crowd management can lead to accidents (like death of almost 200 people in fireworks in a Kerala festival in 2016), thefts etc.

NEED FOR BETTER INFRASTRUCTURE

1. To be able to cater to needs of large number of people
2. Having facilities like first-aid, fire prevention, drinking water, toilets, lost and found counter etc.

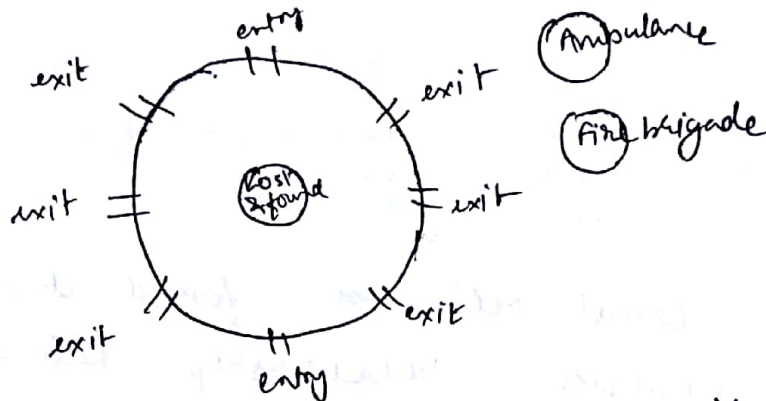
EFFECTIVE CROWD CONTRA MEASURES

1. At places where robust infrastructure doesnot exist, it can be temporarily erected as per the needs of the event if adequate crowd planning is done.
2. With growing population, overcrowding is bound to increase therefore district administration needs to be prepared.
3. To minimise loss of human lives by providing safe avenues of religious-cultural tourism.
4. To protect vulnerable people like old, children.

In this regard NDMA guidelines for crowdmanagement is very significant.

NDMA GUIDELINES

1. Need to prepare a map of the region before hand.



- few entry points and multiple exits
 - streamlining crowd using barricades, railings.
 - CCTV cameras to detect any theft.
 - Ambulance, fire services in waiting.
2. Awareness education to visitors of how to respond in event of crises like move in direction of crowd, protect chest using hands etc.

Any event if preplanned can be conducted smoothly. India already has experience of holding Kumbh festivals which are world's largest events and this can be emulated.

14. State the conditions that are conducive for the formation of coral reefs. Mention the anthropogenic factors that have resulted in their decline. Also highlight its consequences. (250 words) 15

प्रवाल भित्तियों के विकास के लिए अनुकूल दशाएँ बताइए। उन मानवीय क्रियाकलापों का उल्लेख कीजिए जिनके परिणामस्वरूप प्रवाल भित्तियों का ह्रास हुआ है। साथ ही, इसके परिणामों पर भी प्रकाश डालिए।

Coral reefs are formed due to symbiotic relationship between the small reef producing organism called coral polyps and algae called zooxanthellae which provides food and nourishment.

REEF BUILDING - Corals build skeletal shells using calcium carbonate. Once the organism dies the shells are colonised by other corals thus in this manner huge fringing barrier or atoll reefs are made.

CONDUCTIVE CONDITIONS -

1. Temperature : narrow range of $25-27^{\circ}\text{C}$
2. Salinity : 33 ppt
3. No turbulence : like not at mouth of river, or regions with upwelling, downwelling.

As a result reef building corals occur mostly upto tropics.



ANTHROPOGENIC FACTORS LEADING TO DECLINE

Most of the world's corals are facing the threat of bleaching. World's biggest great barrier reef off the coast of North eastern Australia is greatly threatened, due to reason:

1. Rising global temperature due to global warming.
2. Incoming of UV rays due to depleting

- ozone layer.
3. Nutrient enrichment / Eutrophication due to disposal of municipal, agricultural waste in rivers (and river flowing into ocean)
 4. Acid rains due to increased SO_2 , NO_2 concentrations (due to automobile exhaust, industrial fumes)
 5. Mining, port development
 6. Oil spills - which restrict penetration of solar radiation, oxygen

CONSEQUENCES

Coral reefs which are called 'rainforest of the ocean' due to huge CO_2 sequestration capacity are threatened due to bleaching in which the algae leave the coral polyps leading to whitening.

This can damage not only ocean ecosystem but threatens entire ecological balance. Therefore sustainable development towards SDG 14 protecting water life below water is essential.

15. In combining the sea floor spreading theory with continental drift and information on global seismicity, the theory of Plate Tectonics provides a coherent explanation for crustal movements. Discuss. (250 words) 15

महाद्वीपीय विस्थापन सिद्धांत और वैश्विक भूकंपीयता के बारे में सूचना के साथ सागर अधस्तल विस्तार सिद्धांत को संयोजित करने से, प्लेट विवर्तनिकी सिद्धांत भूपर्पटी संचलन की एक सुसंगत व्याख्या प्रदान करता है। चर्चा कीजिए।

Plate tectonics is the most advanced, well-accepted theory to explain the geological formations of the earth.

EMERGENCE OF PLATE TECTONIC THEORY

Theory emerged by combining the existing continental drift theory of Alfred Wagner with the data of sea floor spreading and paleo magnetic studies.

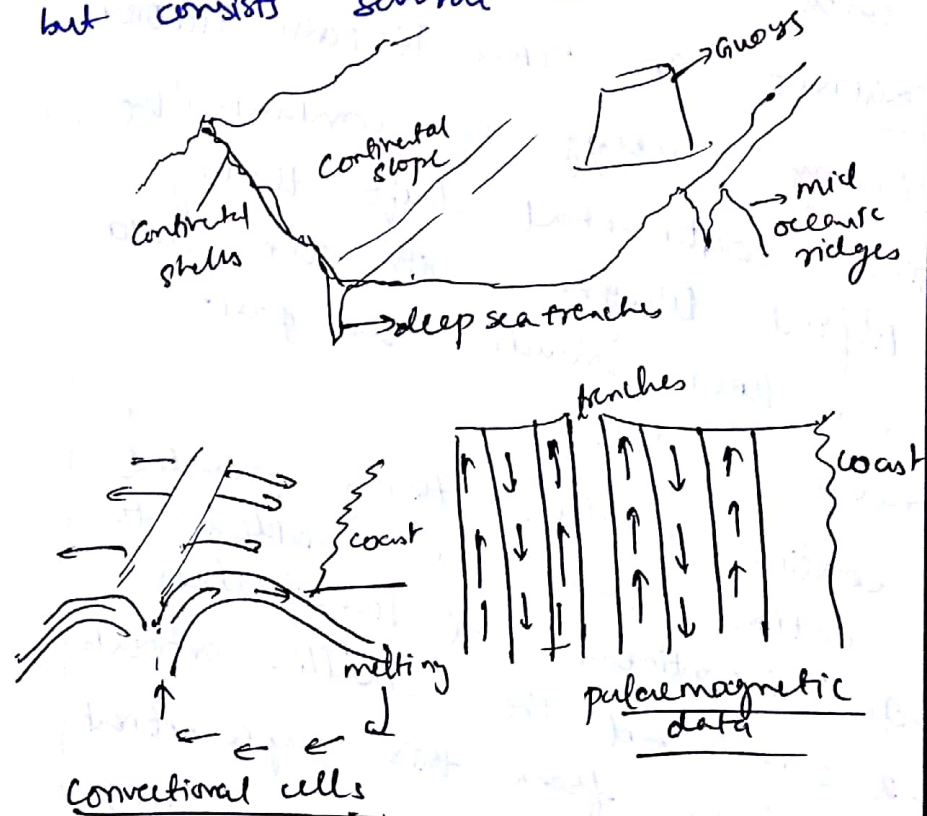
Continental drift theory provided that entire earth was divided into Panagea (continent) and Panathalass (mega ocean) and the smaller continents broke down from this supercontinent. It was based on evidences like zig saw fit of continental margins,

size age of minerals, rocks etc.

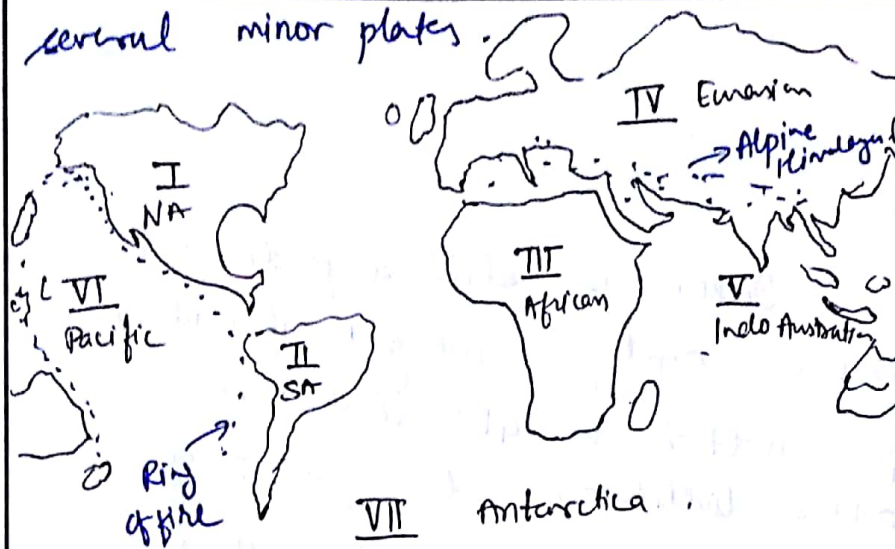
However it could not explain -

- location of volcanoes, earthquakes
- forces behind movement of continents and breaking from panagea.

After sea floor spreading, it became clear the ocean floor is not uniform but consists several structures like -



Based on these the Plate Tectonic theory evolved, which provided that earth is made up of 7 major and



It is able to explain seismicity, existence of volcanoes, like - earthquakes in ring of fire (88%) and alpine Himalayan belt (15%) of total as these regions are located at plate boundaries.

Also volcanism at mid oceanic ridges is reason for younger oceanic crust while old crust at continents. Overall it is the plates, floating on a semisolid asthenosphere that move.

16. Provide an appraisal of the vulnerability of the agriculture sector to natural disasters. What can be done to strengthen the resilience of the sector in order to reduce the impact of such disasters? (250 words) 15

प्राकृतिक आपदाओं के प्रति कृषि क्षेत्र की सुभेद्यता का आकलन कीजिए। ऐसी आपदाओं के प्रभाव को कम करने के लिए इस क्षेत्र की अनुकूलन क्षमता को सुदृढ़ करने हेतु क्या किया जा सकता है?

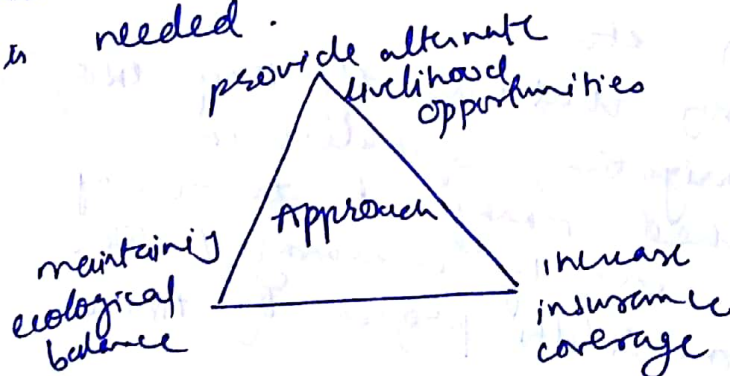
India is still a predominantly agrarian country. Though it contributes only 16-17% to GDP but it provides livelihood to 49% of country's population. Therefore it is essential to do an appraisal of this sector to natural disasters.

Vulnerability

1. Only around 45% of total cultivated area in India is irrigated, this makes it very vulnerable to droughts, floods alike.
2. With climate change instance of extreme weather events are bound to increase. Economic survey 2017-18 pointed out it can lead to decline of productivity in

- unirrigated areas by 15-20%.
3. Most farmers (almost 85%) are small and marginal increasing their vulnerability.
 4. New emerging hazards like
 - rising salt salinity due to faulty agriculture practices
 - desertification

To strengthen resilience of the sector a multi sectoral approach is needed.



1. Alternate livelihood opportunities - like fishing, dairy farming, apiculture (honey exports from India rising sharply) agro forestry.

2. Insurance coverage - PMFBY provides insurance at uniform premium of 1.5 / 2 / 5 %. It ~~can~~ ^{needs to} be further strengthened by increasing coverage to 100% and faster claims settlement.
3. Maintaining ecological balance -
- like climate smart agriculture - choosing ~~the~~ less water intensive crops in dry regions.
 - organic farming
 - ~~the~~ practices like mulching, crop rotation etc
 - increasing water use efficiency through drip irrigation, sprinklers etc.
 - water shed management to revamp ecosystem severely damaged like Ralegaon Siddhi project by Anna Hazare.

But for all this to succeed, capacity building of young generation of farmers and increase awareness among them is essential.

17. Explain what a drought is and describe its different types. Discussing the environmental and societal impacts of droughts, enumerate the factors that aggravate these. (250 words) 15

व्याख्या कीजिए कि सूखा क्या है तथा इसके विभिन्न प्रकारों का वर्णन कीजिए। सूखे के पर्यावरणीय और सामाजिक प्रभावों पर चर्चा करते हुए, इनकी गंभीरता को बढ़ाने वाले कारकों को सूचीबद्ध कीजिए।

Drought is a situation of scarcity of water for agricultural, livestock, even for drinking purposes.

TYPES :

1. Meteorological - due to inadequate rainfall
2. Agricultural - due to faulty agricultural practices such that land is unable to water intensive crops.
3. Ecological - when productivity of entire ecosystem is threatened.

IMPACTS

Societal :

1. Trinkal (3-fold scarcity) - of food (akal), trinkal (fodder) and water.

2. Women, old are most affected who have to travel long distances to fetch water
3. Agrarian distress as 45% of our total ^{cultivated} land area is unirrigated leading to farmer's suicides like in Latur.
4. Death of cattle due to lack of fodder.
5. Spread of epidemics due to consumption of polluted water.

Environmental impact :

1. Lack of moisture in soil can increase chance of soil erosion
2. possibility of desertification increase
3. chances of forest fires increases which can further lead to greater Green house gas emissions.

FACTORS leading to droughts:1. Natural

- El Nino situation
- spatial, temporal variation of monsoon.
- Hard rock structure which make it difficult to recharge aquifer

2. Anthropogenic

- misutilisation of ground water due to practices like flood irrigation
- pollution of water by release of industrial effluents, municipal solid wastes etc. which degrade quality of water for use.
- inadequate storage like in north east

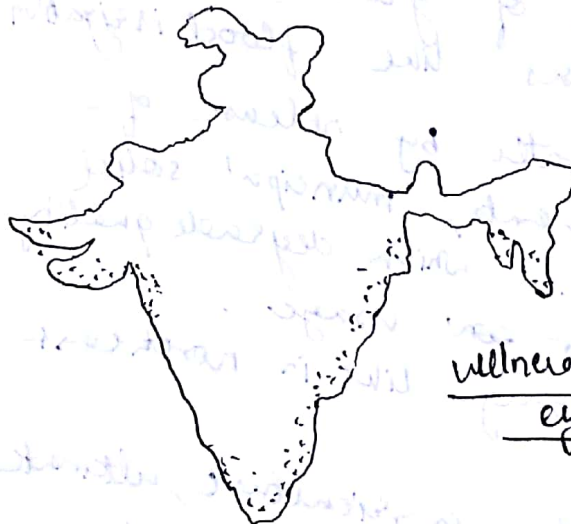
Solutions

1. climate smart agriculture, alternate livelihood opportunities to build resilience, drip irrigation, sprinkler
2. roof-top rain water harvesting, building small check dam.

18. Assess the vulnerability of Indian coastal regions to cyclones. Also, mention the objectives and approach adopted by the National Cyclone Risk Mitigation Program (NCRMP) in this regard. (250 words) 15

चक्रवातों के प्रति भारतीय तटीय क्षेत्रों की सुमेद्यता का आकलन कीजिए। साथ ही, इस संबंध में राष्ट्रीय चक्रवात जोखिम शमन कार्यक्रम (NCRMP) द्वारा अपनाए गए उद्देश्यों और दृष्टिकोण का भी उल्लेख कीजिए।

India is vulnerable to almost 10% of world's total cyclones. However in terms of severity 91 out of 23 most disastrous cyclones impacted India.



According to 2nd ARC, 8% of country's total land area and 40% of total population of coastal states is vulnerable to cyclones.

Eastern states are more vulnerable due to the fact that tropical cyclones travel from east to west.

Post summer, during August-September when sea surface temperature is high, the conditions are suitable for formation of tropical cyclones.

Due to high rates of poverty, especially in Odisha, Andhra Pradesh vulnerability and chances of damage is multifolded.

In this regard National Cyclone Risk Mitigation Program is being implemented by INCOIS.

Objectives :

1. Understanding disaster risk - through mapping, vulnerability analysis.
2. Capacity building, institutional support for preparedness, minimise damage.

3. Funding infrastructure needs
4. Minimise damage to life and property through quick response, recovery post disaster,

Approach adopted

1. Infrastructure building - like underground electricity, telephone cables.
- cyclone shelters with relief material for atleast 1 week.
2. Capacity building - through mock drills, army exercises in rescue and relief.
3. Funding innovative ideas and replicating in other states.
4. Technological solutions - surveying through aerial ways in addition to satellite mapping.

19. What role have volcanoes played in formation of earth's atmosphere in the past? Elaborate on the impact of volcanic activity on climate change in contemporary times. (250 words) 15

अतीत में पृथ्वी के वायुमंडल के निर्माण में ज्वालामुखियों ने क्या भूमिका निभायी है? समकालीन समय में जलवायु परिवर्तन पर ज्वालामुखीय गतिविधियों के प्रभाव का सविस्तार वर्णन कीजिए।

Volcanoes are the vents in the earth surface through which molten magma called lava, gases like SO_2 , CO_2 , dust particles etc are ejected from time to time.

ROLE IN EARTH'S ATMOSPHERE FORMATION

Early atmosphere of earth consisted of primarily H, He, CO_2 etc. Due to repetitive volcanism other gases like N, CO_2 , SO_2 came up and the constituents got modified. This process is called degassing.

Presence of SO_2 lead to cooling of atmosphere further leads to condensation of water vapour.

This lead to formation of oceans.

When oceans formed, CO_2 got dissolved in it leading to further drop of temperature. Finally when living cells came up oxygen came into atmosphere.

Thus volcanism (along with others like meteor strikes) is an important event in formation of earth atmosphere in present structure.

IMPACT ON CLIMATE CHANGE

Release of SO_2 in the atmosphere cools the atmosphere by upto few degree celsius. This gives hope to revert the global warming through.

1. Creating artificial volcanoes to eject SO_2 , dust, aerosols.

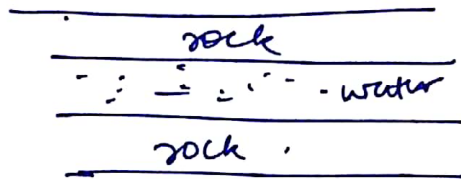
However its feasibility is
still under research.

20. A need has been felt to demarcate aquifer systems in the country so as to provide critical information to plan for their sustainability. Analyse. Also, mention the steps taken by the Government of India in this regard.

(250 words) 15

देश में जलभृत (एक्विफर) प्रणालियों को सीमांकित करने की आवश्यकता का अनुभव किया जा रहा है, ताकि उनकी संधारणीयता संबंधी योजना बनाने हेतु महत्वपूर्ण सूचना प्रदान की जा सके। विवेचन कीजिए। साथ ही, इस संबंध में भारत सरकार द्वारा उठाए गए कदमों का भी उल्लेख कीजिए।

Aquifers are the underground reserves of water trapped within the layers of rocks.



Need to demarcate :

1. for sustainable usage : usage of aquifers is increasing due to agricultural, industrial needs leading to their depletion.

2. Once depleted - they are very difficult to recharge due

to presence of hard lakes.

like regions of Vidarbha, Rayalseema are facing.

Therefore, conservation of aquifers to tide over difficult drought conditions is necessary.

Also these conservation will increase overall ecological productivity.

STEPS TAKEN:

1. Central Ground Water Commission along with ISRO has begun task of aquifer mapping.
2. Promotion of watershed development, rain water harvesting.
3. Artificial aquifer recharging technique.