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GENERAL STUDIES (Test Code : 485), 7 September

Name of Candidate	VANDANA RAO	Registration No.	7954
Schedule		Module	177
Place		Time	
Date			
Classroom		Distance Learning	
Classroom & Distance Learning			

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Total Marks Obtained

Remarks:

Signature of Examiner

INSTRUCTIONS

1. Do furnish the appropriate details in the answer sheet (viz. Name, ID Number and Test Code).
   उत्तर-पुस्तिका में सूचनाएं भरना आवश्यक है (नाम, प्रश्न-पत्र कोड, विद्यार्थी क्रमांक नम्बर आदि।
2. There are TWENTY-FIVE questions printed both in HINDI and in ENGLISH.
   इसमें पच्चीस प्रश्न हैं तथा हिन्दी और अंग्रेज़ी दोनों 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 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 (क्यू.सी.ए.) पुस्तिका के मुख-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।

1. Describe the salient features which characterize tropical cyclones. Why, with only about 6 % of world tropical cyclones, the Indian sub-continent is one of the worst cyclone affected areas of the world? 10
उष्णकटिबंधीय चक्रवातों के मुख्य अवयवों के आधार पर इसकी प्रमुख विशेषताओं को बताइए। विश्व में मात्र 6% उष्णकटिबंधीय चक्रवात ही आते हैं फिर भी भारतीय उप महाद्वीप विश्व के सबसे बुरी तरह चक्रवात प्रभावित क्षेत्रों में आता है, क्यों?

Tropical cyclones are rapidly rotating system of high velocity winds and thunderstorm clouds associated with heavy rains. They are typically named so in the Indian Ocean and Southern Pacific ocean region. Their salient features are:

1) They are low pressure system where the wind flows inwards and the cyclone rotates anti clockwise in Northern Hemisphere and clockwise in Southern Hemisphere.

2) The eye of cyclone is the lowest pressure zone and air rises rapidly. If the eye travels over land, massive destruction occurs depending on the pressure gradient.

3) They typically originate in Bay of Bengal more frequently than in Arabian sea after the monsoon season when sun traverses towards the southern hemisphere

and the ocean surface heats up and develops low pressure.

Cyclones are associated with storm surges and the clouds can bring in flooding even in inland regions when it makes the land fall. The high velocity winds wreak havoc due to the gale force.

Why Indian Subcontinent is disproportionately affected :-

The sub continent is densely populated and the coastal regions typically sustain many communities. These are the one typically affected by livelihood loss.

Till recently the forecasting abilities were abysmal and the evacuation warnings weren't heeded or weren't issued. The disastr mitigation and prevention measures were inadequate

The mangroves protect against the

storm surges, but they are under a lot of stress due to pollution, population and higher damage to property and lives occurs.

2. When the Earth warms up, a large number of changes take place in the atmosphere, the oceans and on the land surface. Some of these changes can, in turn, affect the temperature. These are called feedback effects. Some of these 'feedback effects' increase global warming, while others reduce it. Explain the feedback effects associated with the following: 10

(i) Water vapour

(ii) Snow and ice cover

(iii) Clouds

जब पृथ्वी गरम होती है, वायुमंडल, समुद्र एवं भू-तल में बड़ी संख्या में परिवर्तन होता है। इनमें से कुछ बदलाव तदनुसार ताप में भी परिवर्तन करते हैं, इसे प्रतिपुष्ट प्रभाव कहते हैं। इनमें से कुछ प्रतिपुष्ट प्रभाव वैश्विक तापमान को बढ़ाते हैं तथा कुछ घटाते हैं। प्रतिपुष्ट प्रभाव को निम्न के सन्दर्भ में समझाइए-

(1) जल वाष्प

(2) तुषार एवं हिम चादर

(3) बादल

Climate feedback effects amplify or diminish the critical warming caused by anthropogenic or natural causes. They are respectively called positive and Negative feedbacks.

Water

(1) Vapour: It has a positive climate feedback effect. It is a green house effect gas and has the potential of warming the atmosphere to the extent of doubling the effect by CO_2. Warmer the atmosphere more the water vapour present in it. Then due to increased temperature the air can hold more vapour further warming the climate.

(2) Snow and ice cover:- Due to the albedo of the white snow and ice cover on poles and other regions, the sun's radiation is reflected back into the space. But as temperature increases the ice cover decreases and the dark sea surface emerges which absorbs more heat leading to further warming of the atmosphere.

(3) Clouds: Clouds have a variable effect on global warming depending

on their type and location. On the whole the clouds reflect the solar radiation and thus have cooling effect but clouds also absorb the infrared radiation and re emit them leading to warming of earth's ~~lower~~ atmosphere.

3. Explain the issue of 'Loss and Damage' with respect to UNFCC climate talks. Also examine the demand for creation of a third pillar in UNFCC deliberations, in addition to the two pillars of mitigation and adaptation, associated with loss and damage demands. 10

UNFCC की जलवायु सम्बन्धी वार्ता के संदर्भ में, 'हानि और क्षति' के मुद्दे को व्याख्यायित कीजिये | इसके साथ ही UNFCC के विचार-विमर्श में हानि एवं क्षति से सम्बन्धित दो स्तम्भों न्यूनीकरण और अनुकूलन के आलावा एक तीसरे स्तंभ के निर्माण की माँग का भी परीक्षण कीजये |

Loss and damage means permanent and irretrievable loss and reparable damage to the countries most vulnera to the climate change. The losses are further categorised as Economic and Non economic losses. Economic losses would be a farmer unable to grow crops due to salinity of soil among many others. Non economic losses would be loss of culture, livelihood, ecosystems etc.

Moreover these loss and damages occur due to one time severe events or slow onset events like typhoons and sea level rise respectively.

The vulnerable countries like those in G-77, Association of Small Island states and least developed countries demand that loss and Damage be made separate pillar of climate negotiations. They contend that the damage and loss they have suffered and will continue to suffer deserve to be repaired, compensated and rehabilitated which is not possible under the mitigation and adaptation pillar.

But the developed industrialised countries oppose this categorisation because of future possibility of them having to pay compensation in monetary terms to the affected countries or accepting refugees migrating due to adverse climate change effects.

4. Recently, Genetic Engineering Appraisal Committee (GEAC) gave approval for field trials of a whole range of genetically modified crops in India. Should GM crops be allowed? Discuss with special reference to environment and biodiversity. 10

हाल ही में, जैव प्रौयोगिकी मूल्यांकन समिति (जी ई ए सी) ने भारत में आनुवंशिक रूप से संशोधित फसलों की एक पूरी श्रंखला को क्षेत्र परीक्षण की स्वीकृति प्रदान की है | क्या जीएम फसलों के प्रयोग की अनुमति दी जानी चाहिए ? पर्यावरण और जैवविविधता के विशेष संदर्भ में चर्चा कीजिये |

The Genetic Engineering Appraisal Committee gave approval to a variety of genetically modified crops like rice, mustard, cotton and brinjal for field trials in 1acre plots. Field trials are way to gauge how this crops would fare in Indian conditions This is the first stage in a slew

of stags before the GM crop is allowed into the market.

There have been many concerns about the adverse effects these crops may have on our environment and biodiversity.

- GM crops would lead to monoculture and it is a possibility they would takeover the indegenous varietis.
- Moreover they are made to withstand some pests, extreme conditions and weedicide [to eliminate the intended weed without affecting the GM crop]. These measures can lead to development of resistance in pests or weeds and a superbug and superweed could destroy the ecosystem.
- Also the effects of these GM crops on soil and animals, bees, birds etc that would feed on them are

yet unknown and may be potentially very dangerous.

Most importantly the foreign DNA these GM crops contain, the effect it will have on humans is also in the realm of unknown.

There is a view that the agricultural yield, pest resistance etc can be increased by organic and traditional methods. Also if GM crops are efficacious in the lab settings, their field trials can be conducted in ~~secret~~ strictly controlled conditions and all the effects known as far as possible before introducing them for wider ~~comp~~ consumption.

5. (a) 'Ozone depletion and the formation of Polar Ozone Holes doesn't lead to a further warming of the troposphere, but to a slight cooling.' Explain. 5
ओजोन क्षरण एवं ध्रुवीय ओजोन छिद्र के बनने से क्षोभमण्डल और अधिक गरम नहीं होता बल्कि थोड़ा ठण्डा हो जाता है। व्याख्या कीजिए।

Ozone hole is the breakdown of ozone molecules (O_3) due to chemicals like CFCs in the presence of UV rays in the polar regions in the stratospheric region of our almosphere.

Ozone is responsible for absorbing harmful UV radiations coming from sun. Moreover it is also responsible for absorbing the long wave Infrared radiations reflected from the earth's surface

If the ozone depletion occurs and the hole develops these warming effects arising from the absorption of UV and Infrared radiations would cease and the tropsphere would actually cool by a few degree further worsening the ozone depletion.

5. **(b)** How has the use of science and technology facilitated disaster prevention planning? 5

विज्ञान एवं प्रौद्योगिकी के प्रयोग ने किस प्रकार से आपदा प्रतिकार योजना को सुदृढ़ किया है।

Natural Hazards like earthquake, cyclonic storms, floods, droughts etc become disasters with a magnified loss of lives, property and livelihood due to a variety of factors and risks. But science and technology can play an important part in disaster prevention planning.

Earthquake resistant structures, sound structural stability, retrofitting of old structures can mitigate damage by earthquakes. Sound urban planning and land use keeping in mind coastal and flood plain regulations can manage the damage caused by floods, tsunamis. Vulnerability analysis of disaster prone areas can come in very handy.

Moreover when the disaster strikes, science and technology can be used to indicate the land fall, inundation zones, impact, wave heights etc so that adequate evacuation warnings can be issued beforehand and evacuation routes can be decided. This would surely minimize the damage to life and property. In the relief and rehabilitation too, crisis mapping, crowd sourcing information can help immensely all of it

6. Do you agree that there is a drive towards increasing use of fossil fuels after the Fukushima nuclear disaster? Discuss the availability of coal in the world and in India. 10

क्या आप समझते हैं कि फुकुशीमा परमाणु आपदा के बाद विश्व जीवाश्म ईंधन की ओर तेजी से उन्मुख हुआ है? विश्व एवं भारत में कोयले की उपलब्धता पर चर्चा कीजिए।

In 2011, a 9 at Richter Scale Earthquake hit and a tsunami destroyed the Fukushima power plant due to which a number of Nuclear Reactors were damaged. It led to a lot of radiation leakage and thousands of people were affected.

The incident led to a rethink about the supposedly safe Nuclear Energy. The share of nuclear energy in world's total energy output has declined slightly. Japan and Germany are the two countries which have slanted thinking of shutting down their reactors and produce electricity through Renewables or fossil fuel sources. But else where USA, India and China are going through with their plans of increased share

of the nuclear power. Moreover France spent billions of euros for safety precautions as it gets $\frac{3}{4}$th of its energy from nuclear power.

Distribution of Coal:

Coal is possibility the most widely available fossil fuel in the world. It is found in all the continents except Antarctic. USA has the highest proven reserves found in the Appalachian and Rocky mountain regions. Moreover China, Russia have fairly large reserve towards the eastern coast. India has fourth largest reserves. Mainly found in India in Godavari Basin, & Damodar Basin. The stats of Chathsgarh, Jharkhand, Bihar and West Bengal are richly endowed. In ~~Ko~~ southern region too. Neyvali in Tamil Nadu has ~~ses~~ coal reserves.

7. Even after taking many preventive steps there have been several fire accidents in trains recently. Explain the possible reasons behind it and suggest few remedies. 10

यहाँ तक कि कई निवारण कदम उठाने के बाद भी हाल में ही ट्रेनों में कई अग्नि दुर्घटनाएं हुई हैं | इसके पीछे के संभावित कारणों की व्याख्या कीजिये और कुछ उपायों को भी सुझाइए |

Reasons behind frequent fire accidents:-

There is no separate body for supervising the safety operations of the railways. The Railway Board is the apex body for administration, regulation and operation. Kakodkar committee has recommended establishment of Railway Safety Authority.

(2) Smoke and fire detection systems are installed in the AC coaches but the sleeper coaches have no foolproof mechanism due to high level of dust and noise

3) Inflammable materials are not used in curtains, panels, cushions and paints & linen etc which may retard the spread of fire

4) Adequate information about not carrying flammable goods by public is absent. The electric wiring, breaking circuits and pantry car LPG connections etc are not safety checked regularly.

Possible remedies:

1) MOUs with Western countries regarding railway safety practices.

2) Flame detection sensors installed in coaches, pressurised water sprinkler activable from anywhere in the coach. Emergency door working not

3) Inflammable material usage.

Diagnostic software installed for detecting flaws in any component like break cylinder, wiring, coach dynamics etc and information fed to central server to rectify the flaw.

8. What is greenhouse effect and what gases are responsible for it? Describe the potential social, economic and environmental impacts of the continued increase in greenhouse gases. 10

हरित गृह प्रभाव क्या है एवं कौन-सी गैसें इसके लिए उत्तरदायी है? हरित गृह गैसों के लगातार बढ़ोतरी के सामाजिक, आर्थिक एवं पर्यावरणीय प्रभाव को समझाइए।

Greenhouse effect is the warming of the earth's atmosphere due to accumulation of gases like water vapour, CO_2, Methane (CH_4), Nitrous Oxide (N_2O) and Ozone (O_3). The warming effect arises because of absorption of long wave infrared radiations by these gases. This radiation is reflected back from the earth's surface. This effect takes its name from the green houses used in nurseries for tending to plants.

The greenhouse effect has an ~~is~~for important role in maintaining earth's temperature warm enough for life. But excess increase in the earth's temperature will have and infact

is having a deleterious effect on environment, humans and animal life. These green house gases are a result of human activities, - fossil fuel burning, high energy consumption and deforestation etc.

Social Impacts:

Communities become impoverished due to climate change. Their livelihood options decrease.

Adverse weather events increase like drought and floods.

Economic Impacts:

The yields of crops decrease due to unreliable weather patterns due to green house effect

Food scarcity impact countries adversely

Environmental Impacts.

Due to melting of polar ice caps and glaciers the sea levels rise leading to flooding to ~~dam~~ coastal

areas.

- High concentration of CO_2 in sea water affect the corals the keystone species in an oceanic ecosystem.
- Several species become extinct due to the habitat loss and climate change - reduces biodiversity and resilience of earth's ecosystems.

9. Describe the formation of flood plains. Also illustrate why people live in flood prone zones. 10

बाढ़ के मैदानों के बनने की व्याख्या कीजिए। यह भी बताइए कि क्यों लोग बाढ़ आशंकित क्षेत्रों में रहते हैं?

10. What are the types and sources of air pollution and how does it affect living organisms? List a few measures to control air pollution. 10
वायु प्रदूषण के स्रोतों एवं प्रकारों की चर्चा कीजिए। यह किस प्रकार से जैविक संरचनाओं को प्रभावित करता है? वायु प्रदूषण कम करने के तरीकों को सूचीबद्ध कीजिए।

Air pollution is the introduction of harmful chemical & biological and other particulate materials in the earth's atmosphere These materials can cause disease, death and damage to the living organisms.

Types:

Smog: Smoke and fog combined consti
- Fulis smog. CO, NO_2 and other particulate matter enveloping cities skylines like a Haze

Ozone

Particulate Matter - obtaining as a result of ~~fuel~~ fossil fuel combustion

Green House gases

Sources:

Sources of air pollution are — combustion of fossil fuels in houses, vehicles and industries

2) The chemicals used in paints, aerosols
3) Volcanic combustions spew a lot of sulphur dioxide
4) Smelting of metals

Effects on living organisms

(1) On humans - Particulate matter can cause a number of respiratory diseases and can worsen the existing lung conditions like Asthma.
Air pollution can cause inflammation of eyes and mucous linings.
Several other conditions of heart and kidney have been correlated to the air pollution.

(2) Air pollution can lead to acid rain which pollutes water sources and soil and damages plants and vegetations.

(5) Air pollution worsens global warming which has a whole other plethora of ill effects.

Measures to control air pollution -

Switching to renewable energy sources.

Reducing the consumption of fossil fuels

Refining and filtering air emissions coming out of the industries by various methods like scrubbing complete combustion, condensing and precipitating.

11. Even though Africa is very rich in natural resources, it is the most backward continent. Comment. 10

यद्यपि अफ्रीका प्राकृतिक संसाधनों में बहुत समृद्ध हैं, फिर भी यह सबसे पिछड़ा महाद्वीप है। टिप्पणी कीजिए।

Africa is undoubtedly very rich in natural resources like precious minerals eg diamonds, gold, platinum, coal etc but it has remained very backward continent. ▷ This is due to many reasons. Some of these are:-

Lack of technology: Economic development depends on development of science & technology & ICT Africa has no

institutions which can achieve this.

2) Civil wars and ethnic rivalries :- The continent is riven with wars and conflicts which leaves little possibility of domestic stability. Consequently investments are precarious and this is a risk not many are willing to take

3) Primitive trade: The African continent mainly exports raw materials without any value addition and as a result it doesn't achieve the full value. It doesn't have the manufacturing base.

4) Lack of physical and social Infrastructure. The roads, hospitals, schools, telecommunications, railways are scarce and are hindering the creativity and entrepreneurship of African people.

Corruption & lack of democracy: The people in power remain so by whatever means possible and the resultant opacity encourage corruption & exploitation.

2. Foreign aid: The foreign aid discourages the domestic govt to only budget for the aid they receive rather than plan for revenue enhancing measures.

12. (a) What are ocean currents? How do they affect the climate of coasts? Illustrate. 5

समुद्री धाराएँ क्या होती हैं? ये तटीय क्षेत्रों की जलवायु को कैसे प्रभावित करती हैं? व्याख्या कीजिए।

Ocean current is a continual movement of ocean water is a particular direction under the influence of various forces like winds, thermal gradient (temperature differences due to solar heating), salinity gradient, gravity and coriolis effect.

Ocean currents can be on surface or in the deep oceans below 300m from the surface.

Effects on climate of coasts:

Ocean currents are a conveyor belt of hot and cold water globally. They transport warm water from the equator towards the pole and cold water from the pole towards the equator.

Currents like Gulf stream carry warm water and makes eastern

coast of America warmer or more temperate than places at similar latitudes.

The Peru current carries warm water and makes western coast of South America cooler [Chile and Peru]

Thus depending on the type of current the coast areas become temperate or cooler. Sometimes the deserts also develop on the western margins of continents due to the cold currents.

12. **(b)** Salinity and temperature variations determine the stratified structure of oceans. Examine. 5

लवणता एवं ताप में विविधता समुद्रों की स्तरीय संरचना को निर्धारित करते हैं। परीक्षण कीजिए।

The three layers of oceans are normally stable. These layers are Mixed layer at the top and then the pycnocline and at the bottom the deep layer. At higher latitudes only the deep layer is present due to decreased temperature.

This stratified temperature of the ocean is obtained due to the differences in density.

Density differs due to differences in salt content and ~~toon~~ tempera-ture differences.

Warmer water is less dense than the colder water and settles on the top of the colder layer. This leads to the development of the thermocline.

Moreover the salty water is more dense than the non salty. Thus increased salinity increase the density. The higher saline content makes the water settles below the less saline water. This leads to develop-ment of Halocline.

The top layer upto 100 m is well mixed up due to the effects of wind.

These layers prevent the mixing up of water. But when they do in cases of upwelling and downwelling of ocean water, the system returns to equilibrium soon after.

13. Establish the paradigm of 3R's of Disaster Management with special emphasis on the continuum of their relation. 10
आपदा प्रबंधन की 3R मिसालों का उनके अंतर्संबंध के विशेष सन्दर्भ में सम्बन्ध स्थापित कीजिए।

Disaster management comprises of three major activities. These are Rescue, Relief and Rehabilitation. They constitute a continuum and all these of them can be done in close sequence. without waiting for one activity to get over.

Rescue :- Rescue operations means saving human lives. Rescuing people who are stranded and are in a danger of losing their lives and are cut off from any kind of civilisation contact without food, water.

Relief: Relief operations begins immediately when the disaster strikes. It means providing succour of to people by distributing food, medicine tenting equipments, clothes and other necessities. Relief operations need not wait for rescue operations to

Concerned involves providing necessary help to people even before they have been safely evacuated.

Rehabilitation : It means that the people who have lost their property, houses and belongings may compensated. The infrastructure repaired and restored Whenever they are irreparable they are to be replaced. Rehabilitation means that as much as possible pre disaster situation is achieved.

14. (a) Illustrate the role of 'Crisis Mapping' in Disaster Management. 5
आपदा प्रबंधन में संकट चित्रण की भूमिका की स्पष्ट व्याख्या कीजिए।

Crisis mapping means collection, represen-tation and analysis of data during a crisis like natural disaster or other situations like rioting or unrest.

In Disaster management, crisis mapping has a lot of potential to help & rescue the affected people.

It is done by real time gathering of data about stranded people, rescued persons, medical camps,

situation of road networks and other updates from sources like twitter feeds, facebook posts, blogs, satel imagery, news outlets, government handouts etc. This information is then sorted manually or through autom - ation and displayed over online maps, by geospatial mapping and modelling This actionable information can be used by the disaster relief forces to rescue people or distribute relief supplies or update information for alive or dead persons.

14. (b) Differentiate between Risk Assessment and Risk Evaluation. 5
आपदा आंकलन एवं आपदा मूल्यांकन, इनमें अन्तर बताइए।

Risk assessment is the determination of the qualitative and quantitative value of risk in a particular situation to a recognized hazard or threat. Risk assessment is done by measuring two things
The potential loss if no risk management strategy is applied
The probability of the loss happening.

Risk Evaluation is the task of choosing or prioritizing the risk management strategies based on the benefit and cost tradeoff.

For example: cyber attacks on a vital computer network has high risk assessment. To prevent or counter the attack various strategies may be applied like

hiring a dedicated staff or software depending on cost and benefit evaluation.

15. Analyze the difference in approach to Disaster Management of the 1999 Orissa supercyclone and the 2013 Phailin cyclone. 10
1999 में ओड़ीसा के उत्कृष्ट चक्रवात तथा 2013 के फैलीन चक्रवात में आपदा प्रबंधन के तरीकों का विश्लेषण कीजिए।

The super cyclone of 1999 took thousands of lives. The administration that time was taken by surprise. The weather forecasting expertise in 1999 was no where near what it is today. The capabcity of first responders was not developed. And most of all the super cyclone was stronger and powerful or than

Phailin.

Phailin was handled quite expertly by the govt this time. The weather radars tracked the trajectory, speed and landfall of the cyclone quite accurately. The warnings were given out three days in advance. The first responders didn't wait till last minute for evacuation. The ~~relief~~ rescue shelters were well prepared. The relief work started soon after the cyclone made land fall. The communication system didn't go under this time and civilians were kept informed of the govt's rescue efforts and the cyclone warnings.

Overall, it was the planning, mass evacuation and capacity building that prevented the cyclone from becoming an

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unmitigated calamity & human tragedy.

16. Despite Disaster Management Authority being institutionalized in 2005, it has failed to develop sufficient capacity in preparedness as well as relief and rescue operations. Discuss. 10

आपदा प्रबंधन प्राधिकरण के 2005 में ही स्थापित हो जाने के बावजूद भी ऑपरेशनों में यह उचित तैयारी, राहत एवं बचाव की क्षमता को विकसित करने में असफल रहा है। चर्चा कीजिए।

National Disaster Management Authority is the apex organisation for relief & rehabilitation coordination when natural and man-made disaster strikes. It is nominally headed by the Prime Minister and has 9 members who are responsible for policy making and formulation of National Disaster Management Plan.

The operational function is performed by 20 battalions who are drawn from paramilitary forces. They carry out rescue and relief operations in event of a disaster.

But recent calamities: flood in Kashmir Uttrakhand, Bihar and North-Eastern states have exposed the incapacity of NDMA :-

① No National Disaster Management Plan has been formulated which can give guidelines to state disaster management authorities and delineate their responsibilities

There is a lack of coordination between NDMA and the concerned department. Though NDMA has not computed any plan from the time of its completion it has undertaken duplicate projects

The chain of authority is too long. One solution would be to designate the chairman of NDMA as cabinet secretary level and members as secretary to act as disaster management organisation. National executive committee of NDMA should meet more often. Technical expertise should be developed, keeping close coordination with the Indian Meteorological Department and Central Water Commission.

Mitigation plans and risk assessment and vast vulnerability mapping should be done beforehand, sharing information with state governments and NDMA should have authority to ask for implementation of its suggestions and guidelines.

17. Why do earthquake waves develop shadow zones? Also explain the significance of such zones in providing information about the interior of the earth. 10

भूकंपीय तरंगे छायाक्षेत्र क्यों विकसित करती हैं? पृथ्वी की आंतरिक संरचना की सूचना के सन्दर्भ में इन क्षेत्रों के महत्त्व की व्याख्या कीजिए।

When an earthquake occurs many types of waves are generated which are classified as surface and body waves.

Body waves are of two types which are most relevant in this topic about shadow zones. The first is Primary waves which travel through solid as well as fluid media. They

are first to arrive at a seismic station. They travel in a compression, rarefaction mode.

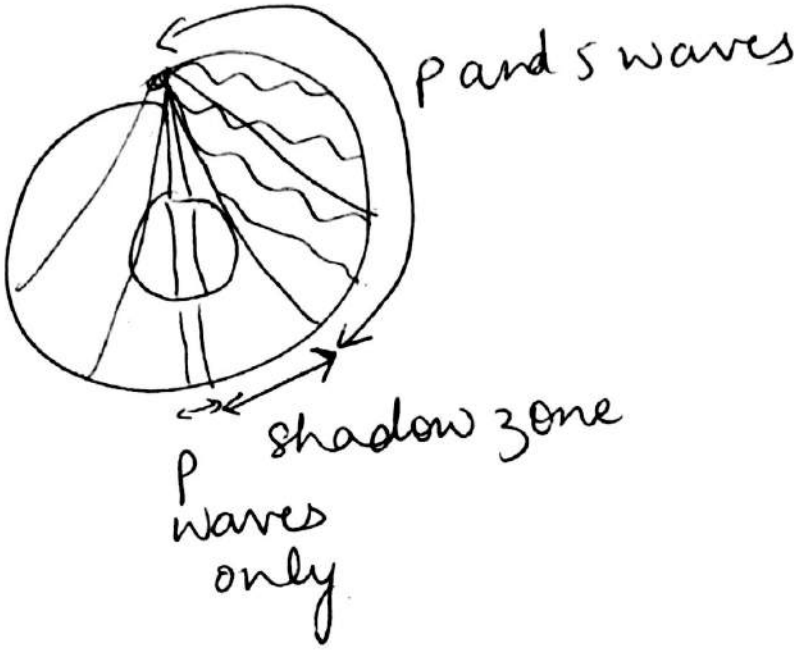
The second type is secondary waves which can't travel through fluid medium and travel in ~~direction~~ motion ^ perpendicular to the direction ~~of wave~~. They are the second to arrive.

Now since the outer core of earth is liquid the S waves can't travel through it. Moreover the P waves are refracted through the outer core and they too don't reach certain points on the crust.

These zones where there are no P or S waves are called shadow zones.

These zones based on their location have provided the useful information about the composition and thickness of the

earth's core.



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18. What do you understand by shifting of wind belts? Illustrate their impact on climate of a region. 10
वायु पेटी के खिसकाव से आप क्या समझते हैं? इसका किसी क्षेत्र की जलवायु पर पड़ने वाले प्रभाव की व्याख्या कीजिए।

The general global circulation of air on earth's atmosphere is altered by various reasons like solar heating due to sun's movement from 23°N to 23°S and pressure gradient and latitudinal changes in temperature. this change is called shifting of wind belts.

Normally in each hemisphere there are three fixed air circulation cells. These are hadley cell, ferrel cell and the polar cells. These transfer energy from equatorial region to the polar regions.

→ The wind belts affect the climate of a region in a substantive way.

Eg: The monsoon in India is thought to be caused by shifting of ITCZ towards the north of equator.

Consequently the south west trades cross the equator and due to coriolis force veer rightwards to the Indian peninsula.

Moreover the warm Gulf stream current gets carried over across the atlantic by the Westerlies and contributes to the temperate climate of UK and western europe.

The ENSO phenomenon is well known. This is affected in the ~~Eo~~ Walker cell. The wind direction changes over the mid pacific region and When the El-nino is strong, western pacific, Australia and India experience less rainfall and Peru, Mexico, California, Chile (Eastern Pacific region) experience high rains.

19. What are the various statutory procedures of conducting Environmental Impact Assessments? How do these procedures ensure public participation in development process? 10

पर्यावरणीय प्रभाव आंकलन करने हेतु विभिन्न सांविधिक प्रक्रियाएं क्या हैं? किस प्रकार से ये प्रक्रियाएँ विकास की प्रक्रिया में जन सहभागिता को सुनिश्चित करती हैं?

Environmental Impact Assessments are decision making tools which weigh the ~~co~~ economic and environmental costs and benefits of a proposed activity or process.

Through the Environment Protection Act 1986, it is mandatory to conduct EIA for mining, thermal power plants, river valley, infrastructure

projects among others depending on the size or capacity of the projects state governments can also clear the projects with or without the EIA.

Procedures involved in conduct of EIA:-

(1) Screening: it finds out if the project really needs the EIA

(2) Scoping: determines the key issues to be studied and investigated

(3) Impact Analysis:- Impact of the proposed activity of environment, flora, fauna and human livelihoods.

(4) Mitigation: Some measures are suggested to reduce the adverse impacts within permissible limits or avoid them altogether.

(5) Reporting: The report is prepared and forwarded to decision making authority

(6) Review and Decision Making: The measures suggested in EIA are reviewed for effectiveness and the

decision is made on the project approval.

People Participation:

The guidelines for EIA demands the participation of affected population at every step of the EIA process.

This participative process makes the project more accountable, transparent. The EIA report comes out to be more reliable and reduces the avenues of conflict.

20. (a) What do you understand by the phenomenon of 'coral bleaching'? Discuss the threats that corals are facing. 5

प्रवाल विरंजन की परिघटना से आप क्या समझते हैं? प्रवाल किस प्रकार के खतरों का सामना कर रहे हैं। चर्चा कीजिए।

Due to the increased temperatures of the sea water the algae residing inside the coral tissues is expelled. This exposes the calcium carbonate [color- white] that the coral secretes which acts as its scaffolding on which the polyps grow - This phenomenon is called as coral bleaching.

Threats that corals are facing :-

Increasing temperatures of oceans.

Global warming - Increased CO_2 concentration (dissolves the $CaCO_3$)

Run off in the form of pesticides, fertilizers and other chemicals

Sedimentation [blocks out the sunlight for photosynthesis]

Storms, cyclones, hurricanes etc

Over fishing and physical damage by equipments.

20. **(b)** National River linking project of India aims to transfer water from surplus regions to deficit parts of the country. Analyse. 5

भारत की राष्ट्रीय नदी जोड़ो परियोजना का उद्देश्य अधिक पनी वाले क्षेत्रों से कम पानी वाले क्षेत्रों में पानी का स्थानांतरण है। विश्लेषण कीजिए।

The National River linking Project aims to build storage reservoirs, river links and canals to link the water deficit basins to the surplus ones.

The eastern tributeries of ganga and Brahmaputra may be connected to the west. The ~~penisns~~ peninsular rivers like Godavari, Mahanadi, Krishna and Kaveri

may be linked. Moreover the rivers flowing towards the west could be linked to service the water needs of the metropolis Mumbai

This project would not only provide drinking water but provide irrigation facilities and generate power too.

But there have concerns about the huge costs, displacement and ecological offects of this massive project.

21. Do you agree that multinational companies are shifting their center of gravity towards Asia? Comment with justification. 10
क्या आप यह समझते हैं कि बहुराष्ट्रीय कंपनियों का केन्द्र स्थल एशिया की ओर हो रहा है? न्यायपूर्ण टिप्पणी कीजिए।

The Asian region has economies which are growing at rates unseen today in the west. Two of the countries are in top three economies with 1/3rd of the total human population. Clearly there is an immense opportunity for growth, a growing middle class, increasing incomes with consistant ability to purchase goods: all the ingredients for attracting the giants of the industry.

It is true that the MNCs have been flocking to the Asian Continent for exploiting low cost labour and to be close to the enormous market place.

But moving from this

a number of MNCs like GE, Bayer, Rolls Roya have moved their business unit headquarters to the Asian countries. Indian, china and Singapore are key countries in this case.

Some are in the process of moving the Global headquarters too. There are several reasons for the shift of the decision making leadership to Asia:-

The growth in these countries will remain high for at the very least this remaining century. Understanding the culture here, encouraging talent from the locals would only make the MNCs more attuned to the needs of the market, and its dynamics.

More over not only the MNCs can transfer knowledge to the locals,

they can learn from them too about doing business in other emerging countries of latin america and africa. There conditions like lack of infrastructure, weak or unpredictable regulatory regime, changing markets are the shared conditions among these continents.

22. The lure of mineral wealth has attracted many immigrants into desert regions. Explain the above statement by giving examples of desert regions around the world that have been transformed by the discovery of mineral resources. 10

खनिज संपदा के प्रलोभन ने रेगिस्तानी क्षेत्रों में कई आप्रवासियों को आकर्षित किया है। खनिज संसाधनों की खोज द्वारा विश्व भर में परिवर्तित हो रहे रेगिस्तान क्षेत्रों के उदाहरण देकर उपर्युक्त कथन कि व्याख्या कीजिये।

23. Elaborate on the measures that can be taken to mitigate the effect of tsunamis. What global mechanisms are in place for providing early warning related to tsunamis? What are the different technologies used for detecting the presence of tsunami waves? 10

सुनामी को निष्प्रभावी करने के तरीकों की व्याख्या कीजिए। सुनामी के पूर्व चेतावनी हेतु किस प्रकार की वैश्विक तंत्र स्थापित है? सुनामी तरंगों की उपस्थिति की पहचान हेतु किस प्रकार की तकनीकी प्रयुक्त की जाती हैं?

When a tsunami will be generated is impossible to predict, but when a tsunami would hit the shore and the impact are amenable to prediction.

The measures that can be taken to mitigate the effects of tsunamis:-

Construction of sea walls- though they are not suitable to all kinds of waves

Scientific modelling to predict the height of waves can be used to obtain the inundation zone area and used to provide the proper evacuation routes

Coastal zoning regulations should be followed earnestly and construction in the susceptible zones disallowed to mitigate the ~~danger~~ damage to

life and property.

Early warning systems have been established in the major oceans like Pacific and the Indian Ocean and the Atlantic. Many of the warnings may be false alarms too. [sea depth variations, coastal landforms] Surface buoys and deep sea pressure sensors are used in the technique called Deep Ocean Assessment & Reporting of Tsunamis (DART) to measure the earthquakes and the resultant energy in the waves to provide possible time to reach the shores and the intensity of waves. These surface buoys interact with satellites which may communicate the information to the Tsunami Information Centres of the coastal countries.

The governments of these countries can inform the citizens

and carry out the evacuation.

24. In the beginning of 2014, North America was badly affected by a cold wave – a fallout of Polar Vortex. What do you understand by Polar Vortex? How does it affect ozone depletion? 10

वर्ष 2014 के प्रारम्भ में उत्तरी अमेरिका ध्रुवीय भंवर (Polar Vortex) के कारण ठंडी हवाओं से बुरी तरह से प्रभावित हुआ था | ध्रुवीय भंवर से आप क्या समझते हैं ? ओजोन क्षरण को यह किस प्रकार से प्रभावित करता है ?

Poles of earth are colder than other latitudes. The cold air is dense and heavy. Consequently high pressure develops at the Poles. Due to the coriolis effect the dense air moves from pole to equator-ward in a slightly curved fashion. This develops in a cyclone like structure with air flowing counter clockwise

direction in the Northern hemisphere and clockwise in Southern one.

This is called polar vortex.

In winters the temperature difference between poles and equator is very high and the polar jet stream flowing from west to east keeps the polar vortex swirling inside the band of air.

But when conditions in atmosphere [in upper troposphere and lower stratosphere] are warmer, the polar vortex is pushed southwards [in northern hemisphere].

In the beginning of 2014, high pressure developing over the eastern pacific disturbed the jet stream. It buckled and the polar vortex expanded to cover half of North American continent. This led to sub zero temperature

in Canada and many of the states in America.

Ozone depletion :-

Polar jet stream keeps the cooler polar air from mixing with the warmer equatorial air. This makes the air inside the vortex very cold. Polar Stratospheric Clouds are formed. The Cl_2 molecules are freed and when sun rays fall near the end of winter the ozone reacts with Cl atoms and its depletion begins.

But as summer approaches this situation breaks up and ozone forms again to again repeat the cycle in winter.

25. Critically analyze the factors for the centralization of IT industry in India. 10
भारत में सूचना प्रौद्योगिकी कंपनियों के केन्द्रीकरण के कारकों की आलोचनात्मक व्याख्या कीजिए।

The IT industry in India is mainly concentrated in Bangalore, Hyderabad, Chennai and the Delhi - NCR Region

The preponderance of southern region is evident. Centralisation of the IT industry is mainly due to following factors:-

Huge Talentpool: The IT industry giants are established in and around the regions where the oldest and most reknowned engineering colleges are located like NITs, IITs etc.

Telecommunication Infrastructure: High speed internet and other infrastructure like power, water etc are huge factors in the establishment of MNCs

Contribution of Diaspora:- A great number of people from the southern

region like Hyderabad, Bangalore are located at high positions in IT giants like Microsoft, Google, Sun etc. Their intimate knowledge of Indian conditions and their own talent has also contributed to a large part.

Research & Development: Moving merely from the BPO and back end IT operations the Indian IT industry is moving towards technology and product development. Microsoft has the largest ~~India~~ Development Centre outside of Redmond in Hyderabad. An innovation centre is also in Bangalore.

Manufacturing Facilities: Several companies, one amongst them Nokia have their manufacturing plants located in the South

Overall, the ecosystem of educated, skilled and english speaking workforce has greatly contributed to the centralisation of the IT industry at specific places in our country.